



Munich Personal RePEc Archive

Food security in South Asia: strategies and programmes for regional collaboration

Muhammad Iqbal and Rashid Amjad

July 2010

Online at <https://mpa.ub.uni-muenchen.de/38077/>

MPRA Paper No. 38077, posted 26. April 2012 12:55 UTC

FOOD SECURITY IN SOUTH ASIA: STRATEGIES AND PROGRAMMES FOR REGIONAL COLLABORATION

By

Muhammad Iqbal and Rashid Amjad

**Pakistan Institute of Development Economics
Quaid-i-Azam University Campus,
Islamabad**

July 2010

Table of Contents

I. Introduction	1
II. Food Security	5
Data Sources	7
Methodology	7
Food Security Index	8
III. Major Causes of Food Insecurity in South Asia	10
Population Growth	10
Rural Urban Divide and Food Inflation	10
Low Agricultural Productivity	11
Disasters	12
IV. Broad Trends in Factors Influencing Food Security	14
Food Production and Availability	14
Accessibility	16
Food Utilization	18
Food Security Index (FSI)	21
Country Level Food Security Indices	23
Food Hunger Index 2009	26
V. Public Policies Related to Food Security	30
Supply Side Policies:	30
Price-oriented Policies	30
Non-price Policies:	30
Demand Side Policies:	31
Public Distribution System	31
Safety nets	31
VI. SAARC Collaboration in Ensuring Food Security: Possibilities and Constraints	33
Liberalization of regional trade	33
Trade in Food Grains	34
SAARC Food Security Bank	35
Agriculture pricing policies	36
Cooperation in Research and Sharing Agricultural Technologies	37
VII: Building Block Approach to encourage Food Security in SAARC through Regional Cooperation	38
REFERENCES	39
ANNEXURES	43

Executive Summary

This study attempts to analyze the food security situation in South Asia in order to help draw up strategies and programmes for regional cooperation in ensuring food security and reducing hunger and malnutrition in the SAARC countries. The focus of the study is on identification of critical factors influencing food security in the region and analyzing their trends. An attempt is also made to construct a food security index for the SAARC using time series data on key factors.

The concept of food security encompasses four dimensions: availability, access, nutritional status (food utilization) and stability. In the context of South Asia, economic access and nutrition are the critical factors explaining why with improved food availability both indicators of hunger and malnutrition have shown only marginal improvements. The food security analysis involves data on several key variables over a reasonable time period. The analysis is confined to wheat and rice which are the main food items constituting diet of common people in South Asia.

The food availability is assessed by examining per capita production and availability of the foodstuffs involved. The access to food is analyzed through per capita real incomes, income inequalities, per capita calories intake, and real food prices (food price index relative to consumer price index). Food absorption aspect is examined using nutrition indicators (malnourishment and underweight) and health indicators (infant mortality, child mortality, immunization coverage, access to safe drinking water and sanitation, and public spending on health).

The major causes of food insecurity in South Asia include high population growth, low agricultural productivity, wide fluctuations in food production resulting from weather variations, and the impact of climate change. The population growth rate has slowed down overtime in almost all the countries of the region with Sri Lanka attaining the lowest population growth rate of 1.3 and Pakistan reducing it to a level slightly over two percent. Though population growth has slowed down in the region yet it is high as compared to developed world and dilutes the impact on per capita basis of growth in food production and general economic growth.

An important reason for the persistent food insecurity in the region is the low productivity of crops and livestock as compared to that in many developed countries. The investment made in

agriculture research as a percentage of agricultural GDP has been declining in many of the South Asian countries from a very low base. The food production in South Asia widely fluctuated from year to year. The agriculture in the region is still highly dependent on weather and vulnerable to natural disasters.

The per capita production index of cereals (wheat and rice) for the SAARC region does not show any significant or sustained increase during the period 1990-2008. It mostly oscillated around the base level of 100 with notable improvements only during three year (1999, 2000, and 2008) in the past 18 years. The overall index is largely influenced by the performance of India (and to some extent Pakistan) being large producers of cereals and accounting for larger populations. Going to individual countries, during the past one decade per capita cereal production in *Bangladesh* showed a major increase after the year 1998. The per capital availability index follows a similar pattern and remained above per capita production index most of the time period reflecting her dependency on food imports. Both the indices remained below the base level of 100 during most of the 1990s in Bangladesh.

In *India* cereal production index showed notable improvement during 1990s except the year 1992. The index remained below 100 after the year 2001 until 2007 mainly due to decline in per capita rice production in this period. The availability index followed similar pattern and remained mostly below but close to the production index. The movements show worsened availability aspect of food security in India during these years.

The per capita production index for *Sri Lanka* showed little improvements (till 2004) with wide fluctuations. The index improved significantly in the later years. However, the availability index shows relatively smoother movements and remained above productivity index as well as the base level of 100.

In case of *Pakistan*, per capita food production index showed small improvements since 1990 with the exception of the years 1991, 1994, and 2002. Surprisingly, the availability index for *Pakistan* remained below 100 and well below production index especially after the year 2000 showing that changes in production of staple food had been inadequately or wrongly responded to. The gradual stepping out from wheat marketing on part of the government during this period and lack of confidence of the private entrepreneurs in public policy for wheat limiting the development of necessary infrastructure in the private sector especially in wheat marketing may

be the key reasons. In short food production in South Asia exhibits wide fluctuation and its growth has been mainly offset by high population growth in the region.

The percentage of population residing in rural areas declined over time in all SAARC countries despite a higher population growth rate in rural areas. This hints at an accelerated migration from rural to urban areas in the region. The accelerated migration along with natural growth of cities inflates the population of net food buyers on one hand and reduces arable land by converting productive agricultural land and water resources to residential and industrial uses on the other hand. Thus the process of urbanization is a potential threat to food security in the region.

South Asia has made some progress in terms of average per capita daily intake of calories since 1990. The average consumption increased from 2280 Kcal/person/day in 1990-92 to 2340 Kcal/person/day during 2003-05. However, it has lagged far behind the world average and the average consumption of calories achieved in developed countries.

The real per capita GDP depicted a positive average growth rate since 1991 in all the countries of the region. The real incomes grew at a relatively rapid rate in Bhutan, India, Maldives, and Sri Lanka as compared to that in Bangladesh, Nepal, and Pakistan. However, a slowdown in growth of GDP in countries of the region has taken place as a result of recent global financial crises adversely affecting the accessibility aspect of food security in countries of the region.

The population living below the poverty line has declined over the period 1991-2004/5 in all countries except Pakistan. In Pakistan it rose in the 1990s and fell post-2001. In terms of relative poverty based on the US \$ 1.25 per day indicator Pakistan's poverty level is much lower than the other countries except Sri Lanka where the level has been consistently lower throughout the period. The wide spread poverty in the region coupled with recent global economic slow down and recent hike in food prices have adverse implications for food security situation in the region.

High food prices result in reduced real incomes of the poor and decline in their food consumption. An upsurge in real food prices was experienced in Bangladesh, Pakistan and Sri Lanka since the year 2000. The higher food prices have a limited positive effect on farm incomes of at least a small portion of producers (that have a sizeable marketable surplus) however, the urban consumers and a significant portion of rural households are net buyers of food and high food inflation adversely affected food affordability of these households.

The public expenditures on health play a key role in improving food utilization aspect of food security. Sri Lanka spent relatively higher percentage of GDP on public health as compared to other countries of the region during the 2000s. Pakistan and India allocated the lowest percentage of their GDP to health sector which has serious implications for food utilization. In Sri Lanka access to improved sanitation has been enhanced from 69 percent in 1990 to over 90 percent of her population. The access to improved sanitation in Bangladesh, India, and Nepal improved overtime but coverage of the population is still among the lowest in the region with over 60 percent population in these countries living without this facility.

One fourth of the population of Bangladesh and one-fifth of the people in Sri Lanka lack access to improved water source during the same year whereas in Pakistan, India and Nepal respectively 10, 14 and 10 percent of the people didn't have access to an improved water source.

Despite showing improvement over time, the prevalence of undernourishment and malnutrition in SAARC countries is quite high. The undernourished in Bangladesh, Pakistan, Sri Lanka, India, and Nepal respectively account for 30, 24, 22, 20, and 17 percent of the population in these countries. The malnutrition was observed among nearly 40 percent of children (under 5 years) in India, Nepal and Bangladesh.

Sri Lanka achieved immunization coverage (against measles as well as DPT) of 99 percent for children of ages 12-23 months. In India and Pakistan respectively over 40 and 20 percent of children couldn't be covered under measles or DPT immunization.

Though most of the indicators of food utilization show improvement overtime in all the countries of the region still a lot remain to be achieved. It will require a re-orientation of the development policies and an enhanced level of public commitment towards these sectors for improving food security situation in the region.

The food security index for SAARC shows little improvement over the past two decades despite reasonable growth rates in agricultural output. The marginal improvement in FSI coupled with increasing income inequalities in most of the countries of the region is a situation of serious concern with regard to food security in these countries.

The Global Hunger Index (GHI) improved in South Asia from 30.7 in 1990 to 23.0 but it is still amongst the highest in the world. The GHI for Sri Lanka stood at 13.7 in 2009 followed by

Pakistan 21.0, India at 23.9 and Bangladesh at 24.7. Except for Sri Lanka almost all the other countries still remain in the range that indicates that hunger remains a serious problem

The countries of the region have implemented a range of programmes affecting supply-side as well as demand-side aspects of food security including those exercising various safety-nets and establishment of public distribution system. The supply-side policies focused on price-oriented policies and non-price policies. The price policies mainly resulted in depressed incentives for the producers and reduced output levels. The non-price policies include development of irrigation, roads, and market infrastructures and investments in agricultural research and extension.

The demand-side policies were centered on public procurement and distribution system and safety net programmes. The procurement and distribution activities involved a large amount of subsidy and huge incidental costs. An adequate food grain storage capacity is a prerequisite for any good distribution system however even the largest countries of the region lack sufficient storage capacity.

The safety net programmes are commonly implemented in SAARC countries and mainly aimed at reaching the most vulnerable. However, these are marred with inefficiencies and adverse selection. India has the rich experience of implementing a large number of safety net programmes aimed at household and individual level food security by addressing access component of food security. Some of these initiatives are Mid-day Meal Scheme, Annapurna Scheme, Food for Work Program, and National Rural Employment Guarantee Scheme.

In Pakistan, Benazir Income Support Program is the main social safety net launched during 2008 to provide cash transfers to the vulnerable identified on the basis of poverty scorecard. It intends to cover 7 million families in the next couple of years. Among other schemes Food Support Program and Child Support Program are important and are being sponsored through Pakistan Bait-ul-Mal.

The growing concerns about food insecurity in the region are resulting in enhanced realization of the need for undertaking collaborated efforts to address the issue at the SAARC level. The study forwards recommendations for regional collaboration. However, given the political realities in the region it may be important to distinguish between what may be desirable and what may be feasible for ensuring food security through regional collaboration both bilaterally and under SAARC. Trying to achieve the best may well be the enemy of the good.

The recommendations for regional collaboration consist of liberalization of regional trade including trade in food item, development of SAARC Food Security Bank, agricultural research collaboration, and consultation on agricultural pricing policy.

There is little doubt as many studies have consistently shown that removing trade barriers between the SAARC countries would benefit all countries in the region. However, most of the studies confirm that the benefits would be marginal or modest at best given low per capita incomes, poorly developed infrastructure, high transaction costs, and identical patterns of comparative advantage in a relatively narrow range of products. Also there is a lack of strong complementarities in the bilateral trade structure in South Asia. However, the process of trade liberalization among the countries of the region needs to be started with strong commitment even if the benefits are marginal to begin with.

The Food Security Reserve for SAARC was established in 1988 to address the problem of food insecurity in the region by building up a food buffer stock that could reduce food security risks. The working of the reserve achieved limited success in addressing the food security concerns of the region due to absence, inadequacy and/or poor conditions of essential infrastructure (storage capacity, roads; and quality certification facilities); lack of political cohesion and economic coordination; delay in deciding various modalities; lack of the confidence that limited reserves of food grain earmarked will be helpful in solving the problem, and the thinking that it is politically too risky to leave food security on the regional forums. The consultation process on deciding the modalities and addressing the issues need to be continued with greater commitment for improving the working of reserves.

Given tough competition faced by the SAARC country in the international market and volatile global prices of food products, they need to strive hard for attaining self sufficiency. The production of important food products needs to be enhanced at lower costs. The path to future food security in the region would require higher productivity in crops and livestock sub-sectors as well as conservation of water and land resources. The countries of region are predicted to be the worst hit by climatic changes. Given their limited resources all the countries of region can address the new challenges through cooperation in agricultural research efforts, sharing research based technologies and exchanging the experiences related to agricultural support services. The promising areas of cooperation include sharing of genetic materials and experiences in

biotechnology, tissue culture, plant genetics, and hybrid seed technology. Collaborated research to combat threats of climate change; conservation of water and land resources; and control of trans-boundary livestock and poultry diseases are the other promising area for regional cooperation. The introduction of new crops and adoption of uniform quality standards by the member states are yet other areas for collaboration.

FOOD SECURITY IN SOUTH ASIA: STRATEGIES AND PROGRAMMES FOR REGIONAL COLLABORATION

Muhammad Iqbal and Rashid Amjad¹

I. Introduction

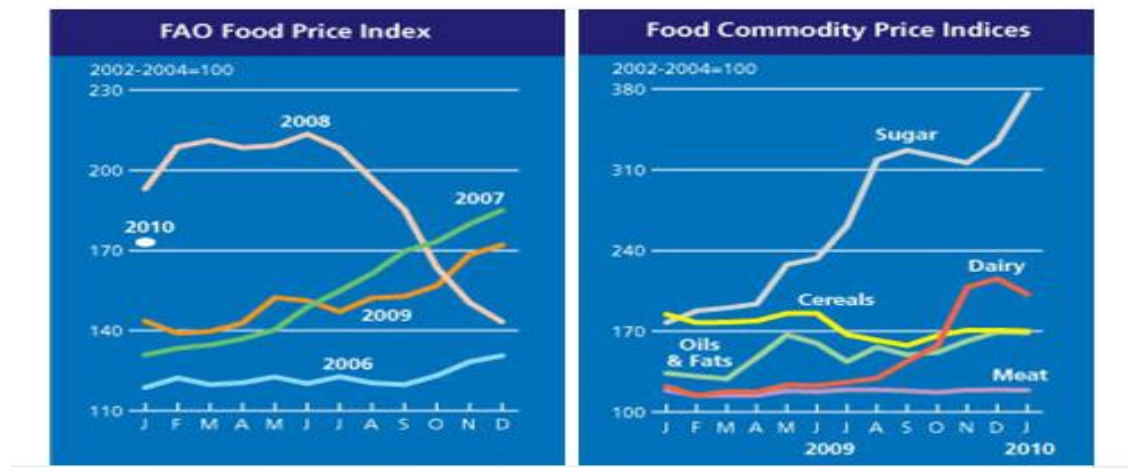
A dramatic increase in food prices from mid-2007 to mid-2008 brought in sharp focus the critical need for ensuring food security in most developing countries especially to protect the poor and vulnerable households. The FAO food price index rose on average by 56 percent in this period and an estimated 75 million people joined the number of hungry in 2007 (FAO, 2008). Though prices subsequently declined, global cereal prices in January 2010 were still 50 percent higher than they were in 2005 (see Figure 1 and Table 1).

A number of factors contributed to creating this imbalance between supply and demand and resulting shooting up of food prices. These included both short-term fluctuations but more importantly deeper structural shifts in demand for food grains which are expected to continue over the long-run. Among these factors poor harvests of food crops in major agricultural regions; increased cost of food production, processing and marketing due to higher oil prices; increased demand from China and India; and diversion of food crops from human consumption use to production of bio fuel and manufacturing of animal feed were the most important. As Mellor (2009) points out food prices affect poverty as high food prices result in reduced real incomes of the poor and decline in their food consumption because they lack capacity to shift food patterns dominated by low cost calories diet.

This increase and subsequent fluctuations in food prices has put millions of people at risk of becoming food insecure and being pushed into poverty across the globe [IFPRI et al. (2009), DFID (2009), UN (2008) and Ivanic and Martin (2008a)]. The poorest households who spend nearly four-fifth of their incomes on food remain the most vulnerable to a sharp rise in prices of staple food items. Studies including on Pakistan suggest that the sharp rise in food prices would increase poverty in many developing countries [Chaudhry and A. Chaudhry (2008), Ivanic and Martin, (2008b); and Wodon and Zaman, (2008)].

¹ The authors are respectively Chief of Research and Vice Chancellor at the Pakistan Institute of Development Economics, Islamabad.

Figure 1



Source: FAO 2010

Table 1: Monthly Food Price Indices (2002-2004=100)

Date	Food Price Index	Meat Price Index	Dairy Price Index	Cereals Price Index	Oils Price Index	Sugar Price Index
2000	89.5	93.9	95.4	84.5	67.8	116.1
2001	92.3	93.7	107.1	86.2	67.6	122.6
2002	90.2	90.3	82.2	94.6	87.0	97.8
2003	98.3	98.7	95.1	98.1	100.8	100.6
2004	111.5	111.0	122.6	107.4	112.2	101.7
2005	114.7	112.7	135.4	103.4	103.6	140.3
2006	122.4	106.7	128.0	121.5	112.0	209.6
2007	154.1	112.1	212.4	166.8	169.1	143.0
2008	191.3	128.3	219.6	239.1	225.4	181.6
2009	151.5	117.6	141.6	173.7	150.0	257.3
Jan. 2009	143.6	118.9	122.2	184.6	133.6	177.5
Feb. 2009	139.0	114.2	114.3	177.4	131.0	187.7
Mar. 2009	139.7	114.6	117.7	177.8	128.8	190.2
Apr. 2009	142.8	114.5	117.4	179.0	147.1	193.7
May 2009	152.3	118.5	123.7	185.5	166.9	227.8
June 2009	151.2	117.7	122.8	185.4	159.6	233.1
July 2009	147.1	119.4	125.9	167.1	143.7	261.5
Aug. 2009	152.2	119.3	129.3	162.1	156.3	318.4
Sept. 2009	152.8	118.4	144.0	157.7	149.6	326.9
Oct. 2009	156.8	117.0	157.5	166.1	151.7	321.3
Nov. 2009	168.3	119.1	208.1	171.0	161.7	315.9
Dec. 2009	172.0	119.2	215.6	170.9	169.3	334.0
Jan. 2010	172.4	119.1	202.0	170.1	168.8	375.8

FAO 2010

At the same it needs to be kept in mind that high food prices can also have a beneficial impact. Improved terms of trade for farmers should increase incomes of at least a portion of the rural population. It is important therefore to make a distinction of the consequences of high food prices in urban and rural areas since a large portion – between 60 to 80 percent – of the population of countries of South Asia live in rural areas. This is an important issue discussed later in this study.

South Asia

Majority of the people of South Asia reside in rural areas and directly or indirectly depends on agriculture for their livelihood. The rural population in Nepal, Sri Lanka and Bhutan account for more than 84 percent of total population whereas over 70 percent of the people of India, Bangladesh, and Maldives live in rural areas (Table 2). Despite the decline in percentage of population living in rural areas the SAARC countries predominately remain rural societies.

Table 2: Rural population (% of total population)

Year	Bangladesh	India	Nepal	Pakistan	Sri Lanka
1991	80	74	91	69	83
2000	77	72	87	67	84
2006	75	71	84	65	85

Source: ADB (2008) & WDI (2008)

Agriculture is the dominant sector of economies of South Asia. Its contribution to gross domestic product (GDP) of respective countries during 1990s ranged from about 26 percent in Pakistan and Sri Lanka to about 52 percent in Nepal. The share of the sector has declined over the years but still accounts for about one-fifth of the GDP in Pakistan and Bangladesh. The contribution of the sector in India and Sri Lanka has declined to about 18 and 15 percent respectively while in Nepal about one-third of national GDP originates from agriculture sector (Table 3).

Table 3: Share of Agriculture in GDP (%)

Year	Bangladesh	India	Nepal	Pakistan	Sri Lanka
1990	30.25	29.28	51.63	25.98	26.32
2000	25.51	23.35	40.82	25.93	17.60
2005	20.14	19.10	36.35	21.47	13.50
2008	19.00	17.60	33.10	20.20	15.20

Source: ADB (2009) and other issues

South Asia with over 40 percent of the world's poor of which India constitutes 33 percent (living on less than US \$1.25 a day) and 35 percent of the world's under-nourished has the highest concentration of poverty and hunger in the world (World Bank, 2008). The enormity of malnutrition in South Asia can be gauged from the fact that it is the home of nearly two-thirds of the world's undernourished children. More than 56 percent of the world's low-birth weight babies are born in South Asia (FAO, 2007).

These depressing numbers seem to contradict the fact (as we shall show later) that South Asia has expanded its food production during the last two decades. In spite of this South Asia's record in reducing malnutrition is one of the world's worst.

This then is the fundamental problematique that this paper addresses. What explains this stubborn persistence of significantly high levels of poverty and malnutrition in South Asia despite reasonable expansion in food production? Are these structural factors (e.g. population growth, skewed distribution of land) and inequitable access to key resources, level of education and literacy especially for females, poor economic management (food grain pricing, trade and distribution policies) or lack of and/or insufficient safety nets for the poor?

This critical discrepancy as IFAD (2007) points out is a "sombre reminder that the challenge of ensuring food security for all involves more than simply raising the level of per capita food production". This point is again re-emphasised in IFPRI et al. (2009) which states that "in South Asia, the major problem is a high prevalence of underweight in children under five, resulting from the lower nutritional and educational status of women, poor nutrition and health problems, and inadequate water and sanitation services".

Study Outline

In the background of complex, diverse and risk-prone nature of overall food security situation in the SAARC countries, this study attempts to analyze the food security situation in the region in order to help draw up strategies and programmes for regional cooperation in ensuring food security and reducing hunger and malnutrition in the region. The specific objectives of the study are as follows:

- a) to identify critical factors influencing food security in South Asia;
- b) to make an initial attempt, that could be improved upon through closer regional cooperation, at the construction of a food security index for South Asia to track progress in achieving food security keeping in view its availability, stability, access, and nutritional status dimensions;
- c) to analyze scope for regional cooperation in devising policies related to pricing, procurement, and trade of major foodstuffs in member states that would lead to greater food security in the region as a whole; and
- d) to suggest specific and realistic strategies and programmes for regional collaboration for mitigating food insecurity in the region.

The report is divided into six sections. After the introduction, Part II explains the concept of food security and outlines various aspects of food security analyzed in this study. The sources of data used in this report are also identified in the same section. Part III analyzes some of the key factors resulting in food insecurity. Part IV analysis broad trends and key developments influencing food security and makes a preliminary attempt at developing a food security index (FSI) for the region based on countries for which data are available that could be further built upon through exchange of information and technical expertise in the region. The FSI is also developed for individual countries for which data are available and trends analysed. Part V reviews public policies related to food security in the region. The final section presents realistic strategies and programmes for regional collaboration for mitigating regional food insecurity. The paper ends with a suggested “Road Map” for accelerating regional cooperation in ensuring food security based on the analysis, results and recommendations of this study.

II. Food Security

The concept of food security surfaced during the mid-1970s resulting from the world food crises. The World Food Conference in 1974 defined food security in terms of assuring steady supply and price stability of basic foodstuffs at the international and national level:

“Availability at all time of adequate world food supplies of basic foodstuffs to sustain a steady expansion of food consumption and to offset fluctuations in production and prices”.

In 1983, FAO analysis focused on food access, leading to a definition emphasizing the balance between the demand and supply side of food security with the demand side being highlighted in terms of economic accessibility:

“Ensuring that all people at all times have both physical and economic access to the basic food that they need” (FAO 1983).

The definition went through a number of improvements during the later years to include household and individual levels, in addition to regional and national levels of aggregation, in food security analysis. Mainly due to the writings of Amartya Sen, the question of 'access' and 'entitlement' gained prominence and the widely accepted definition of food security was adopted in World Food Summit (1996) worded as:

“food security exists when all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life” (World Food Summit, 1996).

This definition encompasses four dimensions: availability, access, nutritional status (food utilization) and stability. Let us examine each in turn:

Availability of Food: The regular availability in sufficient quantities of foodstuffs of appropriate quality (at convenient places) in accordance with tastes and preferences of the people is an essential though not sufficient aspect of food security. Domestic production, imports, food assistance, and releases from public stocks during a certain year add to food availability while exports, additions to public stock, wastages of food produce during post harvest operations, input as seed, and nonhuman usages reduce the quantity of food items available for human consumption. In turn, availability is affected by a number of factors including production, processing, storage, distribution and marketing systems and technologies.

Accessibility to Food: Access is another important determinant of food security. The accessibility to food depends on factors like incomes, sources of income including remittances, income disparities, real food prices, landlessness, gender, literacy, and employment status. Sen's important contribution in this area is to highlight the fact that even with available food supplies lack of access can lead to vulnerable households facing acute hunger and malnutrition as happened in the Indian Famine in West Bengal in 1943. In the context of South Asia the issue of access is an important factor explaining why with improved food availability both indicators of hunger and malnutrition have shown only marginal improvements.

Food Utilization (Nutritional Aspect): This involves the effective biological utilization (food absorption) through adequate food, clean water, sanitation and healthcare for attainment of nutritional well-being that meets all the physiological needs of an active and healthy life. Thus food absorption has public health and education dimension attached to the concept.

Stability: This implies that the people have all time access to adequate food without involving any risk of losing physical availability and economic access to it as a result of economic shocks and resulting higher prices, natural disaster (floods, droughts, earthquakes, cyclones, and tsunamis), and wars. At a time when global food prices show wide fluctuations this is an important challenge faced by countries in South Asia especially in balancing the need for food security with that of providing price incentives for farmers to increase productivity and output.

Data Sources

The food security analysis involves data on several key variables over a reasonable time period. Information on a number of variables/indicators of food security was missing regarding Afghanistan, Bhutan, and Maldives. Therefore, these countries were dropped from some of the analysis. Though this would only marginally affect the analysis at the regional level as these countries account for only a fraction of population of South Asia (less than 2%) it underlines the importance of building up a reliable data base for these countries. The analysis is also confined to wheat and rice which are the main food items constituting diet of common people in South Asia.

Most of the data are drawn from Food and Agriculture Organization (FAO), World Development Indicators (2008), and Asian Development Bank's Key Indicators for Asia and Pacific, 2008 and 2009. Some of the data were collected from Economic Surveys of the respective countries.

Methodology

There are a number of factors determining the major four components of food security as discussed in the following.

- (i) The food availability is primarily the sum of per capita domestic production and net imports of food stuffs (imports minus exports).
- (ii) The stability or lack of it is reflected in movements in food availability and degree of reliance on imports. The greater a degree of reliance the greater a country is exposed to international

fluctuations in quantities and prices, problem of availability, and country's balance of payments.

(iii) The access to food is a function of the level of per capita real incomes; extent of income inequalities; scale of gender disparity that severely affect nutritional status of girl children and females; unemployment rate; share of food expenditures in total consumption outlays; incidence of poverty and per capita calories intake and its composition. Access is also affected by increase in real food prices (food price index relative to consumer price index) -- higher food inflation reducing affordability.

(iv) The food absorption aspect is examined using nutrition indicators (malnourishment and underweight) and health indicators (infant mortality, child mortality, immunization coverage, access to safe drinking water and sanitation, and public spending on health and education etc.

An attempt is made in this study to examine movements in these key variables over time in various South Asian countries. This allows us to identify crucial factors influencing food security in the region.

Food Security Index

A preliminary attempt is made in this study to construct a food security index (FSI) for South Asia drawing on earlier exercises (mostly using cross-sectional/survey data) undertaken at the country/region level. While it is not possible to cover all key variables² in this FSI, an attempt is made to reflect some of the critical variables (covering various aspects of food security) on which time series data are available for all the countries included in the construct of the index. These indicators include per capita food availability index, per capita food production index, self-sufficiency ratio index, and inverse of relative food price index (clearly there are other factors/indicators the inclusion which may improve the index provided that time series data is available). Food availability per capita clearly is a critical factor in determining food security and was given 50 percent weight. Food production in most of the countries is a key factor that has bearing on level of food consumption but not itself a sufficient indicator thus assigned a weight equal to 1/6. The inverse of relative food price and the self-sufficiency ratio indices were also given weight of 1/6 each. The real food prices index is an indicator for affordability (access) and self-sufficiency index represent the extent of exposure of a country to external quantitative and price shocks. The weights used are similar to those used in Report of Task Force on Food

² The data regarding several factors influencing various components of food security discussed above are not being generated annually thus constraining the choice.

Security in Pakistan (GOP, 2009). The country level food security indices (FSIs) were constructed for the period 1990-2008 using the following formula:

$$FSI = 1/2(PCFAI) + 1/6(PCFPI) + 1/6(FSSI) + 1/6(RFPI)^{-1}$$

Where

PCFAI = per capita food availability index

PCFPI = per capita food production index

FSSI = food self-sufficiency index

RFPI = index of real food price

The region level FSI for the SAARC was developed by taking weighted average of FSIs of individual countries using shares of population of respective states in region's population as weights for each year.

It is important here to discuss why we used (inverse of) real food price index as defined earlier. The prices paid by the consumers (retail prices) and received by the farmers (farm gate prices) generally diverge by significant margins however the divergence between farm gate prices and retail prices in various countries may differ depending on pricing policy (consumers Vs producers protection); transport cost; processing costs; marketing margins; and possibility of cartelization, hoarding and black-marketing etc. The farm gate price of wheat amounted to Rupees 8 and 13 (in local currencies) per Kg respectively in India and Pakistan during 2007. The retail price of wheat flour during August 2007 in Delhi and Islamabad was respectively Rupees 12 and 15 per Kg in local currency units. Pakistani wheat growers have larger share in consumers' rupee relative to their fellows in India. The heavy subsidy on wheat flour in Pakistan and agricultural input subsidization in India can also explain the spread to some extent.

The consumers and producer respond respectively to retail and farm gate prices. The obvious question is that which prices to use for examining the impact of food price on food security? The higher retail prices of food hurting the consumers whereas higher farm gate price inducing the farmers to produce more. We used the inverse of real food price index defined earlier because of the reasons: a) to capture the negative impact of food inflation on affordability of the consumers and b) the impact of higher farm gate prices on food security is taken care of by directly including per capita production index in the calculation of FSI.

III. Major Causes of Food Insecurity in South Asia

Population Growth

The SAARC countries account for over 22 percent of total population of the world with India alone contributing about 1.17 billion people (over 17 %) to it. The shares of Pakistan and Bangladesh in world's population stand at 2.5 and 2.4 percent respectively. The population growth rate has slowed down overtime in almost all the countries with Sri Lanka attaining a population growth rate of 1.3. Bangladesh, India, Nepal, and Pakistan also have moved in that direction though Pakistan still has a high rate of population growth (recently changed to over 2%). Though population growth has slowed down it is still high in relation to output growth and resulted in marginal improvements on per capita basis despite the fact that expansion in food production and general economic growth are somewhat satisfactory.

Rural Urban Divide and Food Inflation

The urban poor are generally more vulnerable to food insecurity resulting from shocks like high inflation. Despite high population growth in rural areas the reduction in the percentage of rural population in almost all the countries (except Sri Lanka during the period 1991-2006) points to an accelerated migration from rural to urban areas. This migration results from both pull and push factors working. Cities offer higher wage and better employment opportunities as well as greater availability of services like heat and education. The push factors that force migrants to leave rural areas include factors like displacement by conflict, disasters, droughts, landlessness, land degradation, and population pressures on land. The natural growth of cities along with rural to urban migration is resulting into fast growing cities. The growth of cities on one hand inflates the population of net food buyers and on the other hand reduces arable land by converting productive agricultural land and water resources to residential and industrial uses. Thus the process of urbanization is a potential threat to food security in the region.

The vast majority of rural and urban households in SAARC countries are net food buyers who are negatively affected by higher prices. However, the impact is expected to be different in rural and urban areas. While the poor in urban areas suffer due to rising food prices the rural households may benefit from rising food prices depending on whether they are net producer or consumers of staple food items as well as the extent of wage adjustment to higher food inflation and mode of payment of wages, keeping in mind that a significant portion of rural population in the region are landless households.

Majority of the south Asian people (two-third or even higher) live in rural areas and a significant portion of it are landless households working as tenant farmers or wage workers in agriculture or non-agriculture sectors. Given that the use of hired labour on most of the agricultural farms in these countries constitutes only a small portion of total labour input, this segment of rural society will mostly suffer from high food inflation.

Further, the land ownership is highly skewed in certain SAARC countries. A vast majority of farm households (50 and over 90 percent respectively in Pakistan and Bangladesh) cultivate farms of small size (two hectares or less). Majority of these farm households are net buyers of food and the rest of them generate only a limited marketable surplus. For example in Pakistan about 30 percent farming households (small owners) are net wheat buyers. Therefore, small size farms benefit to a lesser extent from rising food inflation as compared to the large farm households which produce greater marketable surplus.

Given a vast majority of poor living in rural areas are also net buyers of food implies that impact of high food prices on food security of rural poor can neither be termed as less severe nor be overlooked in SAARC countries.

Low Agricultural Productivity

An important reason for the persistent food insecurity in the region is the low productivity of crops and livestock as compared to that in many developed countries. The investment made in agriculture research as a percentage of agricultural GDP has been declining in many of the South Asian countries from a very low base. India and Pakistan have badly neglected investment for maintaining their vital irrigation infrastructure which has led to its rapid deterioration (Etienne, 2009). There is also great potential for improvement in poverty and food security by investing in development of improved technology and making it available to poor farmers.

Climate Change and Fluctuations in Agricultural Production

Agricultural production in South Asia is prone to high risks resulting from high variations in weather. The future projections of climate change indicate that South Asia is very likely to be affected by warming during this century. The availability of freshwater is projected to decrease and coastal areas will be at greatest risk due to increased flooding from the sea and rivers. It is predicted that a rise in temperature may reduce yields of rice, wheat, other cereals, and certain cash crops significantly (ICRIER et al 2009). Various sub-sectors of agriculture bear the effect

and contribute to global climate change. Any neglect or failure on part of the countries of the region to develop and adopt technologies for climate change mitigation and adaptation of agriculture to sustainable resource use and environment friendly improved practices may lead to severe food insecurity in the region.

South Asian agriculture is still highly dependent on weather (in 2009 India witnessed it in large parts of the country) and vulnerable to natural disasters. Consequently, growth of the sector show erratic movements from year to year in various countries of the region (Table 4). Given the size of agricultural sector, its performance directly effects the overall economic growth of respective economies. Since 1995, the agricultural sector has grown at an average rate of about three percent or more in, Bangladesh, India, Nepal, and Pakistan. However, average growth rate of agriculture was 2.6 percent in case of Sri Lanka during the same period. Clearly in view of high population growth rates the growths performance of agriculture sector of South Asian isn't satisfactory

Table 4: Growth rates of agriculture real value added

Year	Bangladesh	India	Nepal	Pakistan	Sri Lanka
1995	-0.3	-0.7	-0.9	6.6	3.4
2000	7.4	-0.2	4.9	6.1	2.3
2005	2.2	5.8	3.5	6.5	2.9
2006	4.9	4.0	1.8	6.3	7.2
2007	4.6	4.9	1.0	4.1	2.8
2008	3.2	1.6	4.7	1.1	9.5
Avg. (1995 to 2008)	3.53	2.91	3.11	3.81	2.61

Source: ADB (2009)

The problem is aggravated by factors such as rapidly growing population, skewed distribution of assets and income, degradation of the natural resource base and unsustainable management of land and water resources, which include increased and imbalance in the use of plant nutrient, loss of soil fertility and growing use of pesticides (SAARC/FAO, 2006).

Disasters

Another important feature which has an important bearing on ensuring food security is that large areas in several of these countries are disaster prone. Incidence of natural calamities is more severe on the food insecure households. Cyclones and floods in Bangladesh and coastal parts of

India are quite frequent. Recurring droughts are a common feature in the arid and semi-arid parts of India and Pakistan. The respective governments also have to devote large resources to cope with frequent natural disasters.

These complex but inter-linked factors bring out the challenge faced by South Asian countries in ensuring food security. Some of the complexity also arises due to geographical location in terms of inaccessibility for trade because Afghanistan, Nepal and Bhutan are landlocked countries. The situation of food security also varies in SAARC countries due to heterogeneity in their physical and natural resources endowments, biodiversity, socio-economic conditions, climatic factors, and dominance of agricultural sector. Impact of these factors is manifest in variation in nutritional status and diverse food habits of the people.

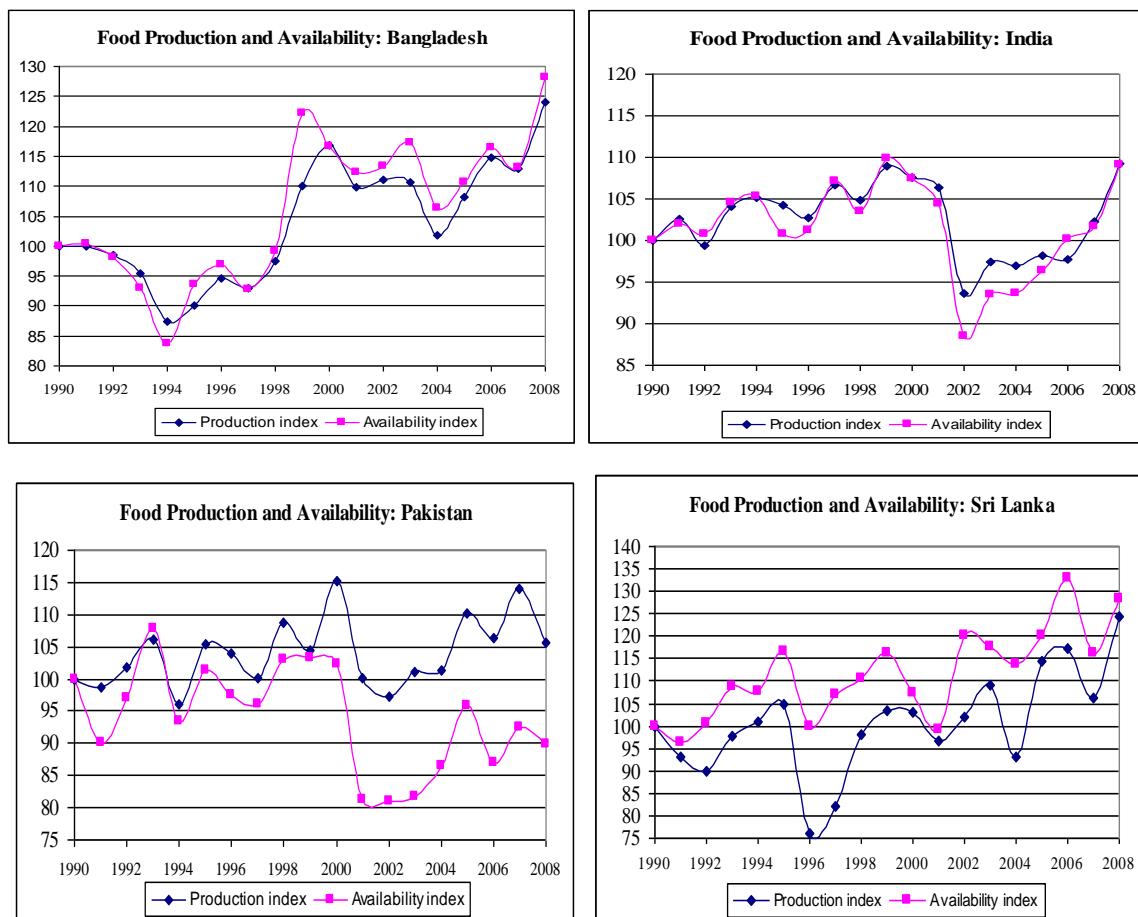
Given the enormity of the challenges faced, it is encouraging that the governments of SAARC countries are strongly committed to the goal of ensuring food security in the spirit of 1996 World Food Summit Declaration and the Millennium Development Goals (MDGs). All countries of the region have taken up food security as one of the important cross cutting theme in their short-, medium-, and long-term plans. Moreover, despite the fact that States in the region are confronted with terrorism, bilateral conflicts, mutual mistrust, and intra-state tensions; the member states of SAARC affirmed their resolve to ensure region-wide food security and make South Asia, once again, the granary of the world during the Fifteenth SAARC Summit held in Colombo on 2–3 August 2008. This underlines the commitment of all governments of SAARC countries to achieve some tangible outcomes in minimizing the food insecurity situation in the region as a whole.

IV. Broad Trends in Factors Influencing Food Security

Food Production and Availability

With significant differences in fluctuations and trends in per capita production for cereals (wheat and rice) the overall per capita production index for SAARC shows no significant or sustained increase (Annexure 1-A). Going to individual countries, during the past one decade per capita cereal production in *Bangladesh* showed a major shift after the year 1998 (Figure 2). The per capital availability index (PCAI) follow a similar pattern and remained above per capita production index (PCPI) most of the time period. The index for per capita wheat production improved significantly during the 1990s attaining the highest level of 177 during 1999 and 2000 (Annexure 1B). However, since 2001 it shows a declining trend. The rice production per capita fluctuated below the base year level of 100 during 1990s and started improving afterwards with some fluctuations (Annexure 1C).

Figure 2



In *India* cereal production index showed notable improvement during 1990s except the year 1992. The index remained below 100 after the year 2001 mainly due to decline in per capita rice production in this period (Figure 2). The availability index remained mostly below but close to the production index. The wheat production index for Nepal improved after mid-1990s whereas growth in production of rice lagged behind the population growth rate throughout the last one and a half decade (Annexure 1-B and 1-C). The cereal production index is mostly discouraging showing wide fluctuations during the same period. The food production index showed small improvements with minor fluctuations (Annexure 1-A).

Wheat is not produced in *Sri Lanka* and the requirements are met through imports. The rice production index for *Sri Lanka* showed small improvements (till 2004) with wide fluctuations (Figure 2 and Annexure 1-B). The index showed significant improvement in the later years. However, the availability index shows relatively smoother movements and remained above productivity index as well as the base level of 100. In case of *Pakistan*, per capita food production index showed small improvements since 1990 with the exception of 1991, 1994, and 2002 (Figure 1 and Annexure 1-A). Surprisingly, the availability index for *Pakistan* remained below 100 and well below production index especially after the year 2000 showing that declines or increase in production of staple food had been inadequately or wrongly responded to. This is partly due the gradual stepping out from wheat marketing and partially due lack of confidence of the private entrepreneurs in public policy and resulted failure in development of necessary infrastructure in the private sector especially in wheat marketing.

Box 1

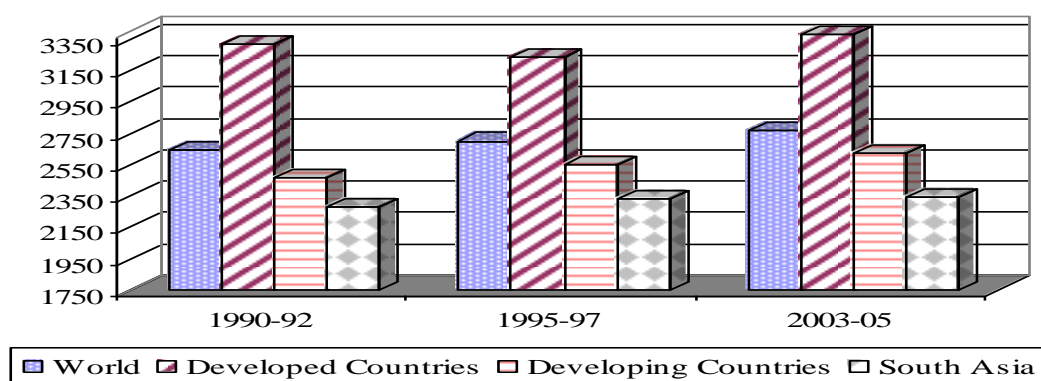
In a decisive move the new democratic government in Pakistan that took over in March 2008 decided to raise procurement prices of wheat for the incoming wheat harvest in Spring 2008 at Rs. 625 per maund from the price of Rs.425 per maund fixed by the last government to ensure better returns to farmers. This was also partly a reaction to the fiasco that had resulted from the policies adopted by the last government which had fixed the price well below world prices for the wheat crop of Spring 2007. Believing it had a bumper crop the then government had first allowed the export of wheat, but since it had fixed the price of wheat well below world prices a large part of the wheat crop was smuggled into neighbouring countries resulting in acute shortages. The government eventually was forced to import wheat at much higher prices than it had exported.

The analysis shows that food production in South Asia exhibit wide fluctuation and the increase in food production has been mainly offset by high population growth in the region. As the possibility of area expansion is limited, South Asia has to increase food production to feed the increasing population by raising productivity. The food production system of South Asia is

generally characterized by a number of other constraints such as small size of landholdings, shrinking supplies of irrigation water, low productivity, poor marketing and transport infrastructure resulting in high post-harvest losses. This problematic situation gets further worsened in the wake of the fact that some areas are prone to a number of natural disasters like floods, droughts and cyclones.

Food production and net food imports are translated into food availability in terms of calorie and protein intake. South Asia has made some progress in terms of average per capita daily intake of calories since 1990. The average consumption increased from 2280 Kcal/person/day in 1990-92 to 2340 Kcal/person/day during 2003-05. However, it has lagged far behind the world average (2770 Kcal/person/day), the average consumption of calories achieved in developed (3380 Kcal/person/day) and in developing countries (2620 Kcal/person/day) as shown in the following figure.

Figure 3



Source: Based on FAOSTAT data

Accessibility

The real per capita GDP depicted a positive average growth rate since 1991 in almost all the countries of the region. The real per capita incomes grew at a relatively rapid rate in Bhutan, India, Maldives, and Sri Lanka as compared to that in Bangladesh, Nepal, and Pakistan (Annexure 2). The growth in per capita GDP picked up momentum after 2002 in all the countries of the region except Nepal. However, a slowdown in growth of GDP in countries of the region has taken place as a result of recent global financial crises adversely affecting the accessibility aspect of food security in countries of the region.

Over 1991-2004/5 the population living below the poverty line has overall declined for all countries except Pakistan based on estimates using the national poverty line or the World Bank new poverty line of US \$ 1.25 a day. In Pakistan, poverty rose in the 1990s after falling in the 1980s but again fell post-2001. In terms of relative poverty based on the US \$ 1.25 per day indicator Pakistan's poverty level is much lower than the other countries except Sri Lanka where the level has been consistently lower throughout the period (Table 5). The recent global economic slow down coupled with wide spread poverty in the region and recent hike in food prices would have adverse implications for food security situation in the region.

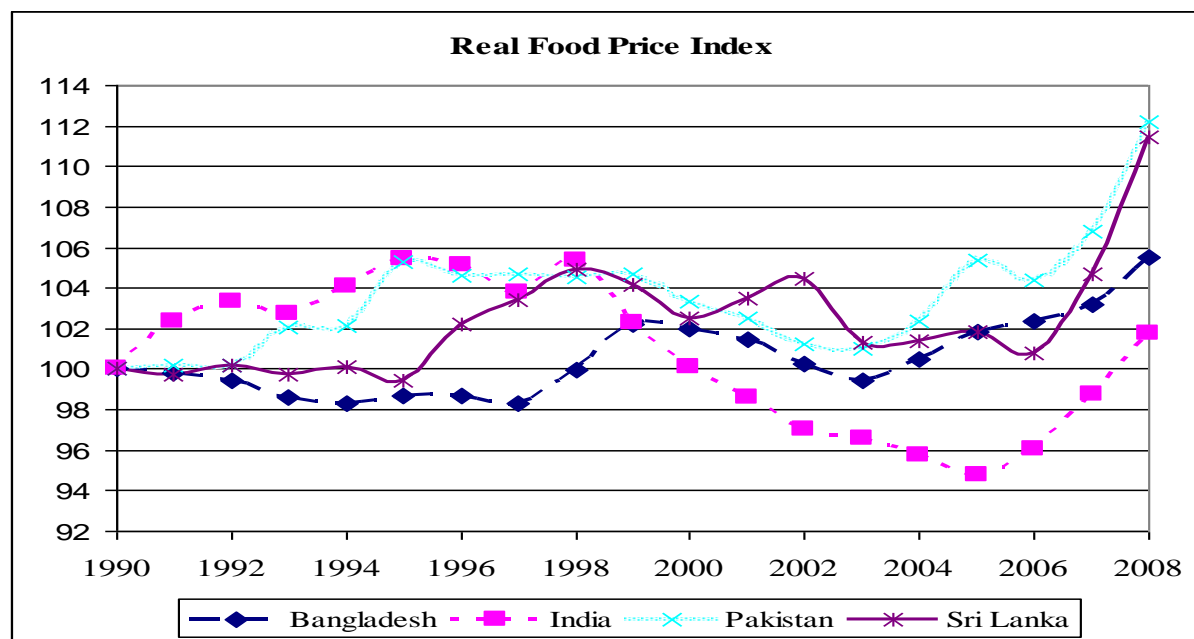
Table 5: Population Living Below the National Poverty Line and Below \$ 1.25 (in *Italics*)
(% of Population)

Years	Bangladesh	India	Nepal	Pakistan	Sri Lanka
1991	68.8	51.3(1990)		22.1/64.7)	20.0/(15.0) 1990
1994	58.2 (1992)/59.4(1995)	36.00	68.4(1995)	28.6(1993)	16.3(1995)
1996	51.00	46.6	41.76	48.1	25.00
1997				31.00	
1999				32.60	
2000	49.80/57.8	28.60		35.9	
2001				34.36	
2002		43.9	55.1 (2003)		22.70/14.0
2004			30.90	22.6	
2005	40.0/49.6	27.5/41.6		22.3(2006)	15.2 (2007)

Source: ESCAP, 2008 and FAO, 2009

High food prices result in reduced real incomes of the poor and decline in their food consumption. The real food prices index (measured as food price index divided by consumer price index expressed in percentage) remained below hundred in *India* since 2000, showing that food prices increased less rapidly than the prices of other consumer items. While in *Bangladesh*, *Pakistan* and *Sri Lanka* an upsurge in real food prices was experienced during the same period (Figure 4). The higher food prices have a limited positive effect on farm incomes of at least a small portion of producers (that have a sizeable marketable surplus) however, the urban consumers and a significant part of rural households are net buyers of food and high food inflation have adverse effect on affordability of these households.

Figure 4



The world price of wheat relative to that of rice increased from 0.45 in January-2000 to 1.02 in October-2002, showing rapid increase in wheat prices relative to rice prices during this period. The relative wheat-rice price ratio when indexed (January-2000=100) reveals that wheat was becoming more expensive relative to rice in the world market till March 2008. The relative price ratio was restored to the level of January-2000 in April 2008 and afterwards rice became more expensive relative to wheat however, in May 2009 again an increase in relative price of wheat was observed (Annexure 3). The consequences of higher wheat price on food security of the poor households in countries/regions where wheat is the staple food are expected to be more profound than those where rice is the staple food.

Food Utilization

The availability and accessibility to food fails to reduce food insecurity in the absence of proper food utilization which is related to factors like nutrition education, health awareness, gender disparities, sanitation, access to safe drinking water, food preparation practices, eating habits, food safety, and health services and infrastructure. The indicators like immunization coverage, infant mortality, child mortality, prevalence of undernourishment, life expectancy, access to safe drinking water and sanitation facilities, and public investment in health are the determinants of food absorption capacity of the population.

Maldives, Bhutan, and Sri Lanka spent relatively higher percentage(over 1% to 8 %) of their GDP on public health as compared to other countries of the region (1% or less) during the years 2000-2008 (Table 6). Pakistan and India allocated the lowest percentages of their GDP to health sector which has serious implications for the aspect of food security under discussion. In Sri Lanka access to improved sanitation has been enhanced from 69 percent in 1990 to 91 percent of the population in 2004. The access to improved sanitation in Bangladesh, India, and Nepal improved overtime but coverage of the population is still among the lowest in the region as the facilities are respectively available to 39, 35, and 33 percent of their population during 2004 (Table 7). One fourth of the population of Bangladesh and one-fifth of the people in Sri Lanka lack access to improved water source during the same year whereas in Pakistan, India and Nepal respectively 10, 14 and 10 percent of the people didn't have access to an improved water source (Table 8).

Table 6: Health expenditure, public (% of GDP)

Years	Bangladesh	Bhutan	India	Maldives	Nepal	Pakistan	Sri Lanka
2000	1.0	4.0	0.7	4.1	0.8	0.7	1.6
2001	0.9	5.0	0.8	3.9	0.8	0.7	1.3
2002	0.9	4.2	0.7	3.9	0.9	0.7	1.5
2003	0.8	2.9	0.6	4.1	0.7	0.7	1.5
2004	0.9	2.6	0.6	4.3	0.7	0.6	1.6
2005	0.8	2.6	0.6	5.5	0.8	0.6	1.8
2006	0.8	2.6	0.6	5.9	0.9	0.5	2.0
2007	0.8	3.3	0.7	5.8	1.0	0.6	1.9
2008	0.8		0.7	7.8	1.2	0.6	1.7

Source: WDI 2007, WDI 2008, ADB 2009, Pakistan Economic Survey 2008-09

Table 7: Improved sanitation facilities (% of population with access)

Years	Bangladesh	Bhutan	India	Maldives	Nepal	Pakistan	Sri Lanka
1990	20	..	14	..	11	37	69
2004	39	70	33	59	35	59	91

Source: Same as Table 6

Table 8: Improved water source (% of population with access)

	Afghanistan	Bangladesh	Bhutan	India	Maldives	Nepal	Pakistan	Sri Lanka
1990	4	72	..	70	96	70	83	68
2004	39	74	62	86	83	90	91	79

Source: Same as Table 6

The prevalence of undernourishment in Bangladesh, Pakistan, Sri Lanka, India, and Nepal was respectively 30, 24, 22, 20, and 17 percent during 2004 showing improvement overtime (Table 9). The prevalence of malnutrition was lower in Sri Lanka than that in India, Nepal, Bangladesh and Pakistan during the last 15 years (Table 10). A decline was observed in malnutrition in all the countries however it was observed among nearly 40 percent of children (under 5 years) in India, Nepal and Bangladesh during 2005-2006.

Table 9: Prevalence of undernourishment (% of population)

Years	Bangladesh	India	Maldives	Nepal	Pakistan	Sri Lanka
1992	35	25	17	20	24	28
1997	40	21	15	26	19	26
2003	30	20	11	17	23	22
2004	30	20	10	17	24	22

Source: WDI 2008

Table 10: Malnutrition prevalence, weight for age (% of children under 5)

Years	Bangladesh	Bhutan	India	Maldives	Nepal	Pakistan	Sri Lanka
1990	66	..	64	..	..	..	..
1991	..	..	..	..	..	40	..
1992	68	..	61	..	..	..	..
1993	..	..	53	..	..	..	38
1994	..	..	..	39	..	40	..
1995	..	..	..	43	49	38	33
1996	57	..	..	..	47	..	..
1997	56	..	..	..	..	..	..
1998	62	..	..	45	47	..	..
1999	61	19	47	..	..	..	..
2001	52	..	..	30	48	35	30
2002	..	..	..	..	..	38	29
2006	39.2		43.5		38.3	31.3	22.8

Source: WDI 2008

The coverage of immunization (measles as well as DPT) has improved during the last 15 years in Sri Lanka and has reached the level of 99 percent (children of ages 12-23 months), the highest in the region during 2006 (Annexure 4 and 5). In other countries the coverage of immunization improved also however remained below 90 percent. In India, over 40 percent of children (children of ages 12-23 months) couldn't be covered under measles or DPT immunization during 2006 whereas in Pakistan about one-fifth of the children in the same age group didn't receive such immunization.

Since 1990, the life expectancy at birth has improved by at least 5 years in all the countries of the region. As a result of better health indicators in Sri Lanka, the life expectancy in Sri Lanka (75 years) is higher than that in other countries of the region where it ranged from 63 (Nepal) to 68 (Maldives) years during 2006 (Table 11).

Table 11: Life expectancy at birth, total (years)

Years	Bangladesh	Bhutan	India	Maldives	Nepal	Pakistan	Sri Lanka
1990	55	54	59	61	55	59	71
1992	56	56	60	61	56	60	72
1995	59	58	61	63	58	61	73
1997	60	60	62	64	59	62	73
2002	63	63	63	66	61	64	74
2005	64	64	64	68	63	65	75
2006	64	65	64	68	63	65	75

Though most of the indicators discussed above show improvement overtime in all the countries of the region yet a lot is still to be achieved. It will require a re-orientation of the development policies and an enhanced level of public commitment towards these sectors for improving food security situation in the region.

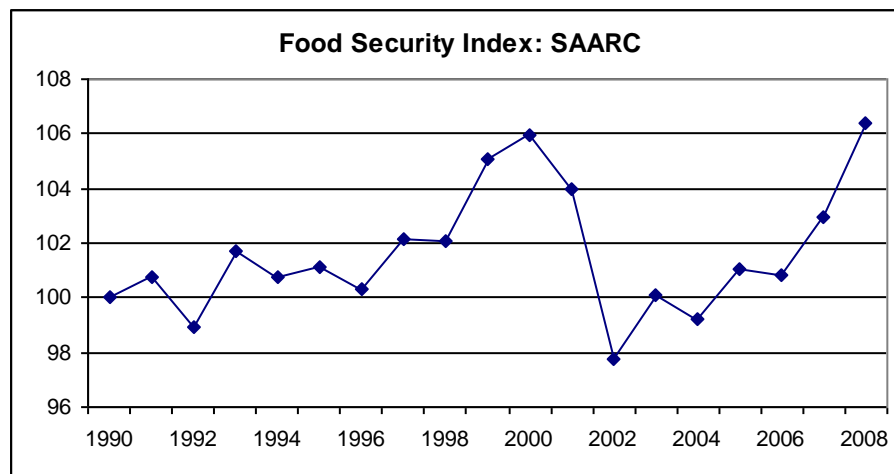
Food Security Index (FSI)

A food security index (FSI) has been developed for South Asia covering Bangladesh, India, Pakistan, Nepal and Sri Lanka based on the following four indicators: per capita food availability index (50% weight); per capita food production index; self-sufficiency ratio index; and index of inverse relative food price (last three equally weighted for the remaining 50%). The first two bring out availability, the third vulnerability in terms of import dependency and the last variable access in terms of rising food prices relative to other prices³.

The food security index for SAARC region so developed based on data from these five countries showed fluctuations in individual years but an overall upward trend till 2000 after which it fell in 2001 and then sharply in 2002. Subsequently it improved but by 2008 it was only marginally better as compared to 1990 (Figure 5 and Annexure 6).

³ However, the inverse relative food price index was included to capture the adverse effect of rise in real food price reflecting accessibility aspect of food security more closely rather than its availability aspect of which the production is an important part. As far as positive impact of high food price on FSI through increased food production (induced by enhanced incentives to the farmers) is concerned, it is taken care of with direct inclusion of per capita food production index (which encapsulate several factors including variables like food prices, weather and other).

Figure 5



The FSI developed by this study therefore shows that despite an overall increase in food production in these countries there has been no significant corresponding improvement in food security in South Asia.

The fact that the food security index has improved very little over the past two decades despite reasonable growth rates in agricultural output and the reduction in poverty needs to be probed more deeply. To start with it is important to keep in mind that in construction of FSI per capita food production index is used with highest weight attached. Even if agriculture output or food production grows at reasonable rate the per capita output/production would have lower growth rate for given positive population growth rate. The FSI is net of population growth effect therefore it shows smaller improvements.

The marginal improvement in FSI coupled with increasing income inequalities in most of the countries of the region is a situation of serious concern with regard to food security in these countries. Income inequalities in India are generally low and Gini coefficient (0.28) didn't change during the period 1990-2000. Sri Lanka, Nepal, and Bangladesh have relatively high income inequalities (with Gini coefficient over 0.4) which have increased over time marginally in case of Bangladesh (1981-82 to 2004) and Sri Lanka (1995-96-2002) and significantly in case of Nepal (1995-96 to 2003-04). Income inequalities declined in Pakistan are higher than that in India and observed an improvement in Gini coefficient from 0.35 in 1988 to 0.30 in 2005-06. However, income inequalities have increased in the most recent period especially in the first half of current decade.

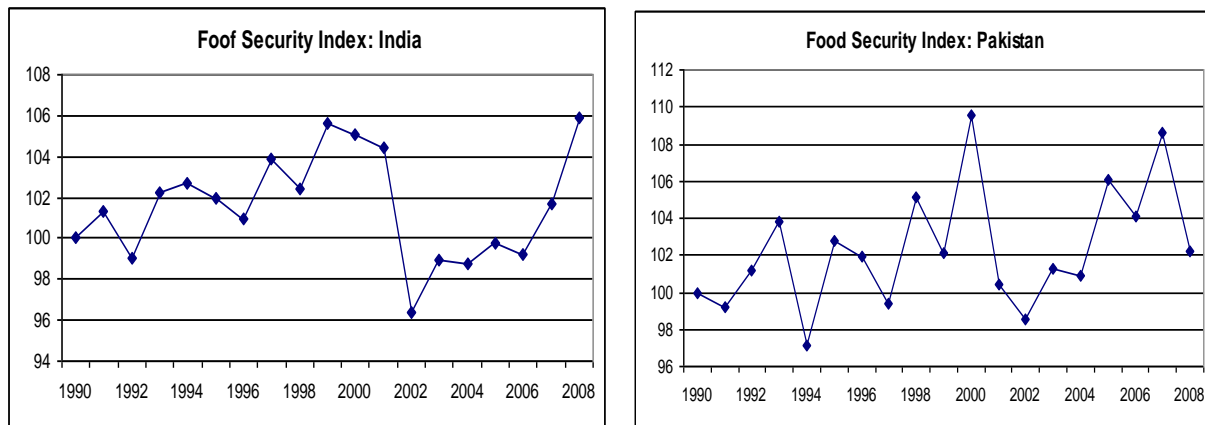
Country Level Food Security Indices

Any FSI for South Asia would be dominated by developments in India that accounts for almost three quarters of the region's population. It is therefore important to see movements in the FSI individually in all countries.

In India, FSI improved gradually during the period 1990-2001 with fluctuations but then declined sharply during 2002 due to decline in production of paddy over 16 percent resulting both from reduced acreage (10%) and lower paddy yield (7%) than the previous year. The paddy area harvested and yields showed a slow recovery for the next four years. The depressed domestic prices played a significant role in slowdown recovery and the FSI remained below the level of 100 till the year 2006. The FSI index for India further improved during 2007 and 2008 (Figure 6 and Annexure 6) as increased food grain prices played an important role in enhancing food grain production.

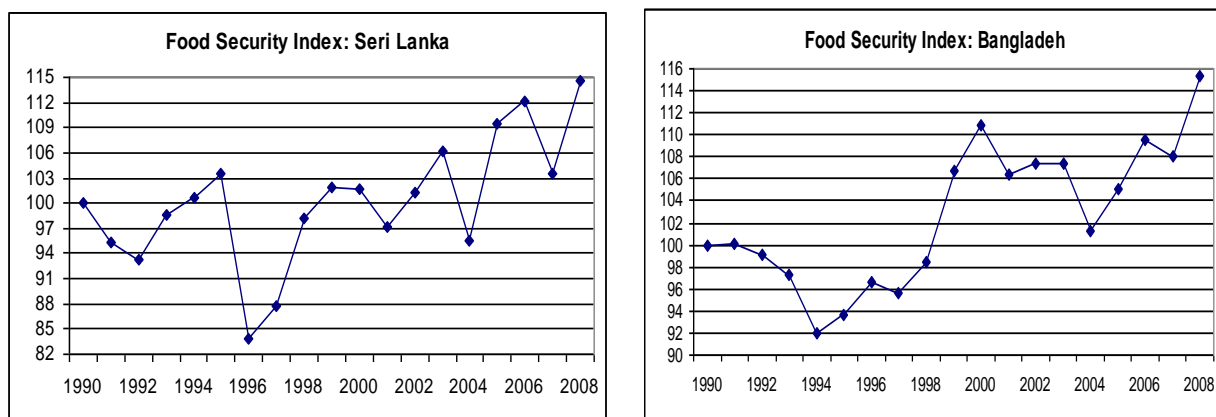
In case of Pakistan, FSI depicted a steady improvement during 1990s but with wide fluctuations. It then fell sharply in 2001 and further declined during 2002. The reduced production of paddy (19%) and wheat (9.7%) during 2001 resulted from decline in acreage as well as yield of both the crops. Further decline in wheat production (4.2%) resulting from reduction in acreage under the crop (1.5%), and its yield (2.7%) during 2002 pushed the FSI to even a lower level. The long dry spells prevailing during these years were mainly responsible for poor performance of wheat and rice in Pakistan. The persistent water shortages, rise in fertilizer prices and depressed food grain prices are responsible for slow recovery in production of cereals in Pakistan. The index recovered subsequently reaching a level in 2007 which was just below what it had been at its peak in 2000. During 2008, the FSI fell again to a level that was slightly above the level of 100 in the base year (Figure 6 and Annexure 6). This is mainly due to declined availability (wheat exported and smuggled out and then delayed imports) and about 10 percent reduced wheat production in 2008 on account of low yield resulting from various factors including water late sowing of crop, water shortage, and low use of DAP fertilizer (discouraged by high prices).

Figure 6



The FSI for Sri Lanka after falling in 1990-92 subsequently increased till 1995. It then fell sharply in 1996. It has subsequently recovered with fluctuations and its level in 2008 is significantly higher than it was in 1990 (Figure 7 and Annexure 6). The fall in FSI during 2004 was primarily due to low production of paddy on account of 17 percent decline in its acreage resulting from drought conditions in both cultivation seasons (Maha and Yala) during this year. Similarly, production of paddy declined during 2007 because of fall in acreage sown due to shortages of water and low paddy prices. It is also noted that year to year fluctuations in paddy yield in Sri Lanka was milder relative to such variations in other countries of the region.

Figure 7



In case of Bangladesh, food security index fluctuated below the base year level of 100 during the period 1992-1998. However, the index showed a notable improvement during the years 1999 and attained a level of 111 in 2000 resulting from about 9 percent increase in production of rice.

Subsequently the level has fluctuated declining sharply in 2004 before recovering to above the peak of 2000 in 2008 (Figure 7 and Annexure 6). The provision of price incentives for enhancing domestic production resorted in National Food Policy 2006 played major role in improvement of the index in later years. The food security index for Nepal remained below 100 since 1991 with sharp fluctuations till 2008. The growth of production of food grains remained lower than the population growth in Nepal throughout this period.

The above analysis suggests that food security in South Asia is prone to sever fluctuations resulting mainly from adverse weather conditions and policy distortions. Bangladesh and Sri Lanka depicted a relatively rapid recovery from sharp declines in food grain production due to more liberalized policies inducing local farmers to produce more as well as their smaller agricultural base.

A notable improvement in food security index has been observed in case of Bangladesh and Sri Lanka during the 2000s due to increased domestic production of food grains. The achievement of reduced population growth rates by these countries, greater price incentives to food grain producers and enhanced openness of the respective economies are the other important factors that contributed positively toward improved Food Security in these countries. The population growth rates in Sri Lanka (0.9%) and Bangladesh (1.3%) during 2008 are the lowest among all the countries of SAARC. The trade openness index (total trade as percentage of GDP) doubled from 20 percent in 1990 to about 40 percent in 2005 in Bangladesh. The greater role of private sector and diminishing public sector participation in the food markets in Bangladesh has helped in preventing starvation in the country. The ratio of total trade to GDP in Sri Lanka increased from 65 percent in 1995 to 80 percent in 2005.

It is important to note that despite such improvements, however, these countries continue to face significant risks to food security and the situation can hardly be termed as satisfactory. The higher food prices in the domestic market provide incentives for more production but have strong negative effects on the welfare of the poor households in a country. Increase in productivity of crops through increased investment in agricultural research and development especially in the crops produced and consumed by the poor is essential for future food security in these countries.

The FSI improved least in case of India and Pakistan over the study period mainly on account of depressed food grain production because of the interventionist policies followed by the

respective governments. The role of private sector in food grain markets remained limited that kept the production below efficient level. The growing population resulting from still high population growths in these countries is another factor for its low performance in terms of FSI and has important implications for food security.

In Pakistan, food production remained mostly depressed due to withdrawal of input subsidies and low prices offered⁴ to the producers during the 1990s. Since the last few years government of Pakistan has started providing subsidy on fertilizer and recently has increase procurement price of wheat above the world price. As a result, a bumper harvest was realized during 2009 which would help in improving the FSI for the next year. Despite positive impact of higher food prices on food production increasing food inflation is the most important factor of concern in Pakistan as it will result in reduction of purchasing power of the poor in Pakistan.

India also has a long history of intervening heavily in the agricultural markets resulting in depressed production of food grains. It has a large food procurement and distribution system and has initiated a large number of safety net programmes aimed at improving access of the poor to food. Frequently exercised restrictions on inter regional movement of agricultural commodities provided disincentives to the local producers while higher prices were paid by the consumers in the deficit areas. Thus such restrictions mainly benefited the traders and rent seeking government officials and have adverse effect on food production as well as food security.

Food Hunger Index 2009

The FSI developed in this study with further improvements and incorporation of other key variables can help policy makers in tracking how the region or individual countries are faring in their quest for improved food security.

However, this variable in itself does not give you a quantitative feel of how close or further away are you from a satisfactory level food security. One country could have made more progress in recent years in improving its food security index as compared to another but still be well behind that country in terms of its overall food security situation or in a situation which could be termed as satisfactory.

⁴ Fixation of procurement price for wheat below world price resulted in heavy implicit taxation of growers and depressed crop production.

The Global Hunger Index is a good indicator of progress being made in eradicating hunger and malnourishment. Developed by IFPRI in collaboration with Welt Hunger Hilfe and Concern Worldwide it ranks countries on a 100-point scale, with 0 being the best score and 100 being the worst, though neither of these extremes is achieved in practice. Values less than 4.9 reflect low hunger, values between 5.0 and 9.9 reflect moderate hunger, values between ten and 19.9 indicate a serious problem, values between 20 and 29.9 are alarming and values of 30 or higher are extremely alarming.

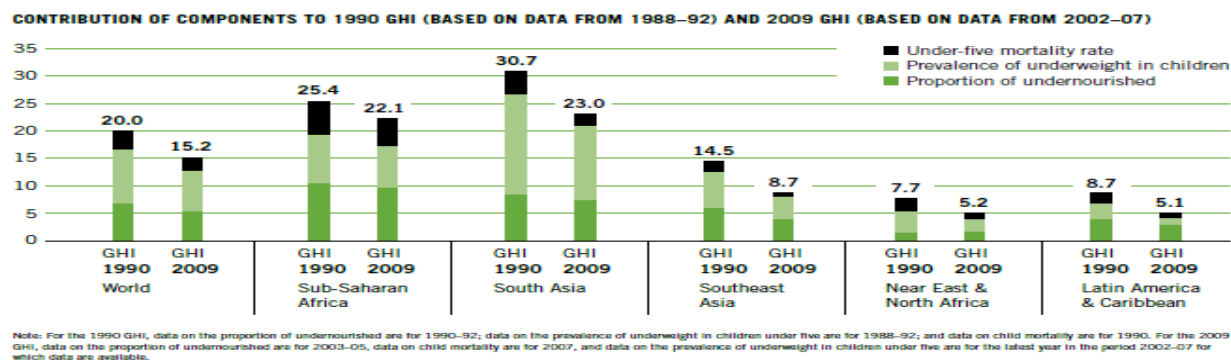
The index combines three equally weighted indicators⁵:

- the proportion of undernourished as a percentage of the population (reflecting the share of the population with insufficient dietary energy intake);
- the prevalence of underweight children under the age of five (indicating the proportion of children suffering from weight loss); and
- the mortality rate of children under the age of five (partially reflecting the fatal synergy between inadequate dietary intake and unhealthy environments).

The recently released IFPRI Global Hunger Index Report (2009) though based on data till 2006 (our FSI covers data till 2008) is still very informative and should raise alarm bells for all the countries in the South Asia region.

The report shows that the Global Hunger Index (GHI) improved in South Asia from 30.7 in 1990 to 23.0 in 2009 (actually 2006) it was still alarmingly high and highest amongst all regions in the world including Sub-Saharan Africa at 22.1 in 2009. The relative position of other regions and World GHI are shown below.

⁵ We do not believe that multicollinearity among variables pose any problem for the construction of an index. As a matter of fact indices are used precisely because of the potential problem of multicollinearity among the variables that may hamper econometric estimation.



Sores: IFPRI et al, 2009

Looking at individual countries Sri Lanka GHI stood at 13.7 in 2009 (compared to 13.7 in 1990), followed by Pakistan 21.0 compared to 24.7 in 1990, India at 23.9 down from 31.7 in 1990 and Bangladesh at 24.7 down from 35.9 in 1990. This shows that except for Sri Lanka almost all the other countries still remain in the range that indicates that hunger remains a serious problem (Table 12). The results also indicate that the lowest decline in GHI between 1990 and 2009 is for Pakistan which is similar to what the analysis of FSI indicated.

Table 12: Global Hunger Index (1990 and 2009)

Rank	Country	1990	2009
35	Sri Lanka	21.1	13.7
55	Nepal	27.6	19.8
58	Pakistan	24.7	21.0
65	India	31.7	23.9
67	Bangladesh	35.9	24.7
	South Asia	30.7	23.0

Source: IFPRI et al (2009)

Trends in GHI again bring out Pakistan's poor performance over the post-1990 period and are a reflection of its continuing very poor human development indicators especially for females. It also points to the need for tackling serious structural constraint in its fight against hunger and malnutrition.

This section has clearly brought out the multifaceted challenge that countries in South Asia face in achieving food security especially in the face of still high and fluctuating global food prices. It also confirms that indicators of economic growth, increases in food production and availability and decline in overall poverty may have marginally improved the situation for South Asian countries they still have a long and arduous task ahead.

The lack of progress in terms of the rate of decline in reducing food insecurity and hunger and malnutrition in some countries also shows that their economic structure in terms of asset and income distribution, progress in HDI and gender disparities may be key factors in explaining their relative lack of progress. This also points to the need for closer analysis at the household level.

V. Public Policies Related to Food Security

The public initiatives aimed at food security undertaken in various SAARC countries included efforts affecting supply side as well as demand side aspects of the issue. The supply-side policies include price oriented (price increasing or cost reducing) and non-price policies (infrastructure development and investment in agricultural research and extension). The price oriented measures undertaken comprise of fixing support /procurement prices for important crops coupled with procurement and distribution activities performed through public distribution systems run by federal or provincial institutions/authorities; providing subsidies to processors or consumers; subsidizing agricultural inputs like fertilizer, biocides, seeds, agricultural machinery, electricity, irrigation water, and institutional credit; reduction of tariff on materials used in production, processing or marketing of important food items; and supplying gas and electricity on subsidized prices to producers of agricultural inputs like fertilizers and chemicals.

The countries of the region have also implemented a range of programmes affecting demand-side aspects of food security including those exercising various safety-nets and establishment of public distribution system (PDS).

Supply Side Policies:

Price-oriented Policies

The SAARC countries have pursued interventionist policies in agricultural output markets as well as input markets. Pricing has been used as an instrument to expand agricultural production, to meet domestic consumption needs, help stabilize agriculture prices, and substitute food imports. Policies are also adopted for agricultural sector to supply food to consumers at low prices. The prices for most agricultural commodities were kept considerably lower than the world prices, and the commodities were put through compulsory procurement by the government agencies. The lower price for consumers had been the main concern with little attention paid to incentives for the producers and international prices. This resulted in depressed incentives for the producers and reduced output levels.

Non-price Policies:

These policies included development of irrigation, roads, and market infrastructures and investments in agricultural research and extension. Empirical evidence shows that agricultural research and development (R&D) through its influence on productivity has been an important

source of growth in agricultural productivity in many of the developing countries including South Asian countries (Evenson, 2002).

Demand Side Policies:

Public Distribution System

The countries of the region have a long history of distribution of staple food at low (below market) prices. All the countries have instituted public distribution systems run through domestic procurements on pre-announced prices and if needed resorting to imports. Procurement of food grains and buffer stock building are important means of food availability on which the distribution of food grains would depend.

Even the largest countries of the region lack sufficient storage capacity. The procurement and distribution system involves a large amount of subsidy and huge incidental costs. For example, the incidentals of the private traders are much lower than that of the state-owned enterprises in Pakistan (Salam, 2003). Similarly, high cost of running such system forced Sri Lanka to switch from the cheap food delivery to food stamps suggesting that the earlier alternative failed to ensure food security for the poor. Moreover, large differential between the issue price and market price not only enhances public expenses but also leads to leakages and rent seeking. The countries of the region need to learn from each others' experiences.

Safety nets

Among the SAARC country, India has the rich experience of implementing a large number of safety net programmes aimed at household and individual level food security by addressing access component of food security. However, these are generally marred with inefficiencies and adverse selection. Some of these initiatives are listed below.

Mid-day Meal Scheme: The scheme initiated for student of primary schools run by government and local governments. Under this scheme food grains were provided free of cost to each child at the rate of 100 grams per school day.

Annapurna Scheme: Under this scheme senior citizens are providing 10 kg grains free of cost per person per month

Food for Work Program: Implemented in 150 most backward districts and at least one able-bodied person from each household is provided 100 days of employment at minimum wage rate.

National Rural Employment Guarantee Scheme: Implementation started during 2006-07 in 200 poorest districts and gradually extended to all the 610 districts of India during 2008-09. The allocation for 2009-10 is Rs. 780 billion (0.66 % of GDP of India).

In Pakistan, Benazir Income Support Program (BISP) is the main social safety net launched during 2008 to provide cash transfers to the vulnerable identified on the basis of poverty scorecard. It intends to cover 3.4 million families or 22.75 million people during the current year and would be extended to cover 7 million families in the next couple of years. Under this scheme the female head of the households is provide Rs 1000/month per family which roughly amounts to an increase of 20 percent in family income.

Among other schemes Food Support Program (FSP) and Child Support Program (CSP) are important and are being sponsored through Pakistan Bait-ul-Mal. Under FSP 1.25 million households are being disbursed a support of Rs. 3000 per year. The CSP is initially piloted in three districts as a conditional cash transfer program. It has been scaled up to 11 districts during the current financial year. At present, the scheme has only one condition that is admission of beneficiary's children aged 5-12 years in school with at least 80 percent school attendance. The beneficiary families are paid Rs. 300 per month with on child in school and Rs. 500 per month with more than one child at school.

VI. SAARC Collaboration in Ensuring Food Security: Possibilities and Constraints

Given the political realities in the region it may be important to distinguish between what may be desirable and what may be feasible for ensuring food security through regional collaboration both bilaterally and under SAARC. Trying to achieve the best may well be the enemy of the good.

Liberalization of regional trade

The intra-regional trade among SAARC countries is very low, at about 5.0 percent of their total trade. Indeed as a recent study points out South Asia is the least integrated region in the world. This study identifies cross-country conflict as the most important reason for this very low level of integration. (Ghani and Ahmed, 2009). Intra-regional trade in South Asia is 0.8 percent of GDP in contrast to East Asia's nearly 28 percent (Rodrigo, 2008).

There are however sharp differences in the patterns of intra-regional trade among South Asian countries (Table 13 and Annexure 7). The share of intraregional imports in total imports of Bangladesh, Nepal and Sri Lanka stood at 15.2, 45.9 and 19.4 percent respectively during 2002-06. On the other hand, Pakistan and India met only 2.8 and 0.9 percent of their import requirements from the region during the same period. The share of regional imports increased around three fold for Bangladesh and in case of Sri Lanka by one-half over 1985-2000. The share of India in regional imports is quite low and increased only fractionally during 1985-2000. Similarly, the share of Pakistan shows only slight increase in imports from the region over time.

Table 13: Intra Regional Trade for SAARC Regional (Average over 2002-06)

Country	Intra Regional Exports			Intra Regional Imports		
	Avg. Value (\$ million)	Region	Share in Own Total Exports	Avg. Value (\$ million)	Region	Share in Own Total Imports
Afghanistan	83	1.2	41.9	896	13.2	39.8
Bangladesh	145	2.1	1.8	1836	27.1	15.2
India	4474	66.2	5.5	984	14.5	0.9
Maldives	17	0.2	13.9	127	1.9	20.0
Nepal	319	4.7	51.9	762	11.2	45.9
Pakistan	1209	17.9	8.9	573	8.5	2.8
Sri Lanka	508	7.5	8.7	1598	23.6	19.4
SAARC Region	6754	100.0	6.2	6776	100.0	4.4

Source: Kumar and Singh (2009).

Trends in intra-regional exports reveal a different picture. On average during 2002-2006 Bangladesh's share was 1.8 percent, Nepal 51.09 percent, Pakistan 8.9 percent and India 5.5

percent. In terms of change during 1985-2000 the share of Bangladesh has gone down from 7.7 percent to 1.6 percent, of Nepal from 38.3 percent to 27 percent, of Sri Lanka from 3.8 to 1.8 percent and of Pakistan from 5.3 percent to 2.9 percent. However, India has been able to increase its share from 3.3 percent in 1985 to 4.4 percent in 2007 (Annexure 8).

There is little doubt as many studies have consistently shown that removing trade barriers between the SAARC countries would benefit all countries in the region. Similarly However, most of the studies also confirm that the benefits would be marginal or modest at best given low per capita incomes, poorly developed infrastructure and high transaction costs (Kumar and Singh, 2009). Other studies (Kemal et al 2000) have also found that given almost identical patterns of comparative advantage in a relatively narrow range of products there is a lack of strong complementarities in the bilateral trade structure in South Asia. However, the process of trade liberalization among the countries of the region needs to be started with strong commitment even if the benefits are marginal to begin with.

Trade in Food Grains

Trade theory would hold that allowing freer trade in food grains between countries would stimulate increases in productivity and growth in food production primarily as a result of an increase in the size of the market as well as help stabilize prices International agencies therefore consistently condemn erection of trade barriers and outright bans in the movement of food grains whenever countries face food shortages.

The reality however is quite different. The basic instinct of governments in the face of food shortages or high export prices is to clamp import duties or ban exports to ensure food grain availability for its population. The alternative is to face food riots and political unrest which clearly no government would like to see. Indeed governments in the region put in place restrictions of food grain movements across provinces and even districts to ensure food security at the local level.

On food grains the region needs to be sub-divided. There is considerable movement in food grains between India-Bangladesh-Nepal and between Pakistan and Afghanistan. However, due to political tension there is little prospects of free movements of food grains in the region for some time to come.

Realistically also the possibilities are limited. The scope for trade depends upon factors like comparative advantage, exportable surplus, complementarities in bilateral trade, seasonality factor, and most importantly political cohesion. India and Pakistan have rice in surplus while other countries in the region are net importers. However, Pakistan till recently has been a net importer of wheat; India has surplus wheat but not on very consistent basis, this constrains her emergence as established wheat exporter. All other countries are net importers of wheat. The region's export of wheat fall short of regions imports. However, starting the process of food trade among the countries of the region is prerequisite for larger possible benefits in future.

SAARC Food Security Bank

The Food Security Reserve for SAARC was established in 1988 to address the problem of food insecurity in the region by building up a food buffer stock that could reduce food security risks, particularly after natural disasters. The working of the reserve achieved limited success in addressing the food security concerns of the region. However, due recognition of the importance of regional and sub-regional collective self-reliance with respect to food security by Member Countries and realization that the establishment of a regional food reserve based on the principle of collective self-reliance would improve their food security resulted in establishment of SAARC Food Security Bank in April 2007. The objectives were to meet the needs of food security in the region and to act as a regional food security reserve (of wheat and rice) for the SAARC Member Countries during normal time food shortages and emergencies; and to provide regional support to national food security efforts; foster inter- country partnerships and regional integration, and solve regional food shortages through collective action. However, in the context of establishment of a SAARC Food Security Bank the development had been slow and attempts are in progress to make it operational (for details see ICRIER (2009)).

A number of reasons are believed to be responsible for the slow progress on the Food Security Bank. These include factors like: a) absence, inadequacy and/or poor conditions of essential infrastructure (storage capacity, roads; and quality certification facilities etc); b) lack of political cohesion and economic coordination; c) limited complementarities to provide basis for such cooperation; d) failure of states of the region to emerge as established food exporter; e) delay in deciding various modalities; and f) lack of the confidence that limited reserves of food grain earmarked (0.24 million tonnes) will be helpful in solving the problem. The consultation process

on deciding the modalities and addressing the issues mentioned above need to be continued with greater commitment.

In summary, it can be concluded that the chances of this dream being realized in an effective manner are still some way off not least because no country would like to be in a situation where it finds itself vulnerable to a dependence on food supplies in an arrangement in which it does not have full confidence. Moreover, food security is a highly sensitive issue in all the countries of the region because of poverty and will be politically too risky to left on the regional forums.

Agriculture pricing policies

Intrinsically linked with trade in food grains is the issue of relative prices of food grains in the countries of the region. For if price differentials are high then even though legal trade may not be allowed porous borders lead to smuggling of food grains across countries. This illegal movement of food grains is not just amongst adjoining neighbours in South Asia but food grains may find their way to the Central Asian countries as was the case of Pakistan wheat in 2007 when low prices and a bumper crop resulted in domestic shortages.

Again a strong school in economics supported by the IFIs postulates that governments should not be in the business of fixing food and commodity prices and these should be dictated by prevailing international prices as this would lead to the best allocation of resources. Yet again as discussed earlier SAARC countries have a long history of controlling or setting food prices of essential items to protect the perceived interest of vulnerable consumers including through food rationing.

In the context of food security there is need for countries to exchange views on supply and demand projections and pricing of food grains and indeed also for essential inputs like fertilizers. This may gradually lead to a convergence of views and help foster reducing trade barriers as countries move to a system of encouraging prices to be set in line with global markets rather than being influenced by domestic political pressures⁶.

⁶The big landlords holding political power put pressure to adopt a cost base pricing system particularly when open market and global prices are on decline. When market forces push the prices upward, the poor especially residing in urban areas which are relatively more organized and have street power put pressure on the government to intervene and bring prices to affordable level. The lower price of food grains for consumers had been the main concern with little attention paid to incentives for the producers and international prices. The depressed agricultural production and productivity.

Cooperation in Research and Sharing Agricultural Technologies

Given highly subsidized agriculture in countries that are the main players in international market and volatile global prices of food products, the SAARC countries should strive hard to attain self sufficiency by promoting production of important food products at lower costs. The path to future food security in the region would require higher productivity in crops and livestock sub-sectors as well as conservation of water and land resources. The countries of region are predicted to be the worst hit by climatic changes. With their limited resources all the countries of region can address the new challenges through cooperation in agricultural research efforts, sharing research based technologies and exchanging the experiences related to agricultural support services. The promising areas of cooperation include sharing of genetic materials and experiences in biotechnology, tissue culture, plant genetics, and hybrid seed technology.

Collaborated research to combat threats of climate change; conservation of water and land resources; and control of trans-boundary livestock and poultry diseases offer the other promising area for regional cooperation. The introduction of new crops and adoption of uniform quality standards by the member states are yet other areas for collaboration.

India has developed significantly its agricultural research and extension system. Pakistan has experimented with the Farmer Field School training program under Integrated Pest Management (IPM). Other countries have also specialized in some crop or resource use. All countries of the region can benefit through exchange of information and collaboration in organizing relevant research activities. The states of the region should enhance allocations to agricultural research and should be open for exchange of experts and training of agricultural scientists.

VII: Building Block Approach to encourage Food Security in SAARC through Regional Cooperation

The main recommendations of this report include:

1. A Roundtable Conference of the experts/representatives of SAARC countries shall be held in order to discuss and adopt the food security index (incorporating possible improvements) for construction and regularly updating of FSI for SAARC and its member states.
2. The SAARC Food Security Bank was established to provide regional support to national efforts for food security. In order to build confidence of member states in such reserves allocations to these reserves needs to be enhanced along with development of required infrastructure. A committee of experts (from member states) should determine the optimal size of such reserves as well as build consensus about development of needed infrastructure (storage, transportation, roads etc) and operational modalities. The committee should also pursue the member states for greater political backup and economic cohesion in this regard.
3. Increased production of food items in the region is essential for food security. More ideally, such an increase in production needs to be achieved through policies that ensure attractive profits to producers and offer affordable prices to the consumers. The enhancement of productivity through increased investment in agricultural research and extension can play a crucial role in this respect. The Regional Food Security Programme needs to develop a research agenda for regional level agricultural issues and prioritize research projects to be financed. Modalities for sharing the technologies developed, genetic resources, and research and training facilities may also be settled. The international donors and member states should contribute necessary financial resources for regional research efforts and also enhance support to the national agricultural research systems.
4. The price differentials across national borders determine possible direction of legal or illegal trade of agricultural commodities. Under free marketing and trade prices of agricultural commodities would stay close to world prices. However, the prices of agricultural commodities are more often distorted (especially of major food items) to ensure food security for the poor and vulnerable groups. The (independent) pricing decisions undertaken by respective governments have impacts for the neighbouring states. The possibility of greater coordination among member states for food pricing policy needs to be explored.

REFERENCES

- Ahmed, B. (1986), "Acreage response of rice in Pakistan, Punjab". *Journal of Development Studies*. 8:63-97.
- Ali, Shujat (2000) Productivity Growth in Pakistan's Agriculture 1960-1996. PhD dissertation, Department of Economics, Simon Fraser University, Canada.
- Asian Development Bank (2009). Key Indicators for Asia and Pacific, 2009.
- Asian Development Bank (2008). Key Indicators for Asia and Pacific, 2008.
- Athar, M., A.D. Sheikh, and M. Kashif (2007), "Acreage Supply Response of Rice in Punjab, Pakistan", *Journal of Agricultural Research*, Vol, 45, No. 3.
- Bapna, Shanti L. (1980) "Aggregate Supply Response of Crops in a Developing Region, . Sultan, Chand and Sons, New Delhi".
- Chaudhry and A. Chaudhry (2008) "The Effects of Rising Food and Fuel Costs on Poverty in Pakistan", *The Lahore Journal of Economics*, Special Edition, 2008.
- Chaudhry, M. Ghaffar, Ghulam Mustafa Chaudhry, and Muhammad Ali Qasim (1996). Growth of Output and Productivity in Pakistan's Agriculture: Trends, Sources, and Policy Implications. *The Pakistan Development Review*, Vol. 35, No. 4-II.
- Chaudhry, M.G. and S. A. Sahibzada (1995). Agricultural Input Subsidies in Pakistan: Nature and Impact. *The Pakistan Development Review*, Vol. 34, No.4-II.
- Dantwala, M.L. (1967) "Incentives and Disincentives in Indian Agriculture". *Indian Journal of Agricultural Economics*, Vol. 22, No. 2.
- (1978), "Future of Institutional Reform and Technological Change in Indian Agricultural Development". *Economic and Political Weekly*, Vol 13, No. 31-33, Special Number.
- (1986), "Technology, Growth and Equity in Agriculture", in John W. Mellor and Gunvant M. Desai (Eds. 1986), *Agricultural Change and Rural Poverty: Variations on a Theme by Dharm Narain*, Oxford University Press, Delhi.
- DFID (March 2009). Eliminating World Poverty: Building our Common Future. Background paper to the DFID Conference on the Future of International Development.
- Din, M. and U. Qadir (2003). Revealed Comparative Advantage and Trade Complementarity in South Asia, Pakistan Institute of Development Economics, Quaid-i-Azam University Campus, Islamabad.
- Etienne, Gilbert (October 2009). Agriculture and the Rural Economy of Pakistan: Towards a Possible Future.
- Evenson, Robert E. (2002). Economic Impacts of Agricultural Research and Extension. Center Reprint No. 578. Economic Growth Center, Yale University

- Evenson, Robert E., Carl E. Pray, and Mark W. Rosegrant (1999). *Agricultural Research and Productivity Growth in India*. IFPRI, Report No. 109. International Food Policy Research Institute, Washington D.C.
- Ghani, Ejaz and Sadiq Ahmed (2009) ed. *Accelerating Growth and Job Creation in South Asia*, Oxford.
- FAO 1998. *Food for All: Success stories in the battle of food security*, TeleFood, FAO Headquarters, Rome 1998.
- FAO, 2007, FAOSTAT, <http://www.fao.org>
- FAO website (2010). *World Food Situation: Food Prices Indices*. <http://www.fao.org/worldfoodsituation/FoodPricesIndex/en/>
- FAO(2009)http://www.fao.org/faostat/foodsecurity/Files/FoodConsumptionNutrients_en.xls
- FAO (1983), *World food Security: a Reappraisal of the Concepts and Approaches*. Director General's Report, Rome
- Government of Pakistan (2009). *Report of Task Force on Food Security*, Planning Commission, Government of Pakistan,
- IFAD (2007). *Food Security, Poverty and Women: Lessons from Rural Asia*.
- Ikram, Muhammad (2000), "Farmers' Response to Support Prices of Wheat in Pakistan", *Pakistan Journal of Agricultural Economics*, July (No. 4).
- ICRIER (September 2009). *Food Security in South Asia: Issues and Opportunities* by Mittal, Surabhi and Deepti Sethi. Indian Council for Research on International Economic Relations, Working paper No. 240.
- IFPRI, Welt Huger Hilfe and Concern Worldwide (2009). *Global Hunger Index 2009*.
- International Food Policy Research Institute (September, 2008). *Global Food Crises: Monitoring and Assessing Impact to Inform Policy Responses*.
- Ivanic, Maros and Will Martin (2008 a). *Food Prices and Food Security: Don't Blame Liberalization*. VOX Research Based Policy Analysis and Commentary. November 21, 2008.
- Ivanic, Maros and Will Martin (2008 b). *Implication of Higher Global Food Prices in Low-income Countries*. *Agricultural Economics*
- Kemal, A. R. et al. (2000). *A Plan to Strengthen Regional Trade Cooperation in South Asia*. Study prepared for the SANEI 1 project, Islamabad, PIDE.
- Kemal, A. R., Musleh ud Din and Usman Qadir (2002). *Pakistan Country Report*, Global Research Project, Pakistan Institute of Development Economics, Islamabad.

- Khan, M. Azeem, Munir A., Qazi H. and Shakeel A. Khan (2008). Country Position Paper for SAARC Regional Program and Strategy on Food Security.
- Kumar, Rajiv and Manjeeta Singh (2009). India's Role in South Asian Trade and Investment Integration. ADB Working Paper Series on Regional Integration, ADB, Manila
- Krishna, Raj (1984), "Growth, Price Policy and Equity", Food Research Institute Studies, Vol. 18, No. 3.
- Mellor, John W. (2009), "Agricultural Development and Food Security". Invited Lecture Delivered at 24th Annual General Meeting and Conference of the Pakistan Society of Development Economists held at Islamabad (31st March-02nd April, 2009).
- (1978), "Food Price Policy and Income Distribution in Low Income Countries". Economic Development and Cultural Change, Vol. 27, October.
- (1976), The New Economics of Growth. Cornell University Press, Ithaca, New York, USA.
- MINFAL, PARC & FAO 2000. Agricultural strategies for the first decade of new millennium. Ministry of Food, Agriculture and Livestock, Pakistan Agricultural Research Council, and Food and Agriculture Organization, Islamabad-Pakistan.
- Mruthyunjaya and P. Ranjitha (1998). The Indian Agricultural Research System: Structure, Current Policy Issues, and Future Orientation. World Development Vol. 26, No.6
- PARC (1996). National Master Agricultural Research Plan 1996-2005. Pakistan Agricultural Research Council, MINFAL, Islamabad
- Pratt, Alejandro Nin, Bingxin Yu and Shenggen Fan (2009), "The Total Factor Productivity in China and India: New Measures and Approaches". China Agricultural Economic Review, Vol. 1 No. 1.
- SAARC/FAO (2006). Support for the Preparation of Regional Programme on Food Security – Project Document (SPFP/RAS/6702) SAARC/FAO, Kathmandu/Bangkok
- Salam, A. (2009). Distortions in Prices of Food Grains in Pakistan: 1996 to 2006. unpublished paper.
- Salam, A. (2003). Agribusiness: From Parastatals to Private Trade. Country Paper on Pakistan, Prepared for the Workshop on 'Agribusiness: From Parastatals to Private Trade', Held at New Delhi, India, 15-16 December, 2003.
- UN (July 2008). Comprehensive Framework for Action: High Level Task Force on Global Food Security Crisis.
- Wodon, Q. and H. Zaman, (2008). Rising Food Prices in Sub-Saharan Africa: Poverty Impact and Policy Response, Policy Research Working Paper 4738, World Bank

World Food Summit (1996). Declaration on World Food Security.

World Bank 2008. World Development Report 2008: Agriculture for Development, IBRD, The World Bank, Washington DC, 2007

- CD-ROM, World Development Indicators 2007

Annexure 1-A: Per Capita Production Index (1990=100) for Cereals (Wheat and Rice)

Year	Bangladesh	India	Nepal	Pakistan	Sri Lanka	SAARC
1991	100.00	102.58	91.39	98.61	92.98	101.56
1992	98.55	99.39	74.43	101.71	90.00	99.01
1993	95.52	104.05	89.81	106.15	97.76	103.05
1994	87.38	105.08	80.84	96.17	101.04	101.68
1995	90.18	104.25	91.34	105.47	104.79	102.65
1996	94.52	102.67	94.28	103.91	76.23	101.58
1997	92.99	106.68	92.49	100.16	82.18	104.02
1998	97.57	104.89	89.29	108.82	98.14	104.27
1999	110.01	108.91	91.74	104.36	103.51	108.24
2000	116.74	107.60	98.32	115.25	103.05	109.41
2001	109.90	106.35	94.73	100.14	96.64	105.85
2002	111.14	93.57	94.80	97.17	102.08	96.16
2003	110.66	97.45	95.01	101.02	109.20	99.53
2004	101.84	96.94	98.88	101.30	93.07	98.16
2005	108.10	98.23	95.85	110.24	114.47	100.99
2006	114.70	97.76	91.69	106.46	117.32	100.89
2007	112.84	102.24	85.66	114.05	106.18	104.33
2008	124.07	109.32	90.76	105.57	124.29	110.29

Based on FAO (2009)

Annexure 1B: Per Capita Production Index for Wheat (%) (1990=100)

Year	Bangladesh	India	Nepal	Pakistan
1991	110.29	108.26	95.39	98.99
1992	114.35	107.06	84.79	103.97
1993	123.43	107.71	83.00	104.63
1994	116.19	110.38	95.08	96.26
1995	125.21	118.92	94.29	105.03
1996	134.90	110.13	101.94	101.87
1997	140.43	120.69	105.27	97.79
1998	170.73	113.36	95.94	107.04
1999	177.22	119.65	101.75	99.82
2000	167.62	125.96	108.36	115.25
2001	149.48	112.99	103.72	101.94
2002	140.74	116.06	110.34	95.88
2003	129.54	103.21	115.49	99.17
2004	105.76	111.47	116.80	99.08
2005	80.88	104.41	119.03	107.91
2006	59.85	103.91	112.76	104.34
2007	59.04	110.96	120.51	113.22
2008	67.00	114.80	104.29	100.53

Source: Calculation based on FAO, 2009

Annexure 1C: Per Capita Production Index for Rice (%)

Year	Bangladesh	India	Nepal	Pakistan	Sri Lanka
1990	100.00	100.00	100.00	100.00	100.00
1991	99.43	98.35	89.77	96.76	92.98
1992	97.68	93.67	70.22	90.69	90.00
1993	93.97	101.33	92.58	113.57	97.76
1994	85.78	101.13	75.05	95.74	101.04
1995	88.24	93.31	90.13	107.57	104.79
1996	92.29	97.12	91.16	113.87	76.23
1997	90.36	96.23	87.28	111.72	82.18
1998	93.51	98.57	86.59	117.50	98.14
1999	106.29	100.90	87.66	126.52	103.51
2000	113.93	93.93	94.24	115.28	103.05
2001	107.70	101.41	91.07	91.33	96.64
2002	109.50	76.81	88.48	103.43	102.08
2003	109.62	93.16	86.68	110.02	109.20
2004	101.63	86.11	91.58	112.09	93.07
2005	109.61	93.63	86.42	121.59	114.47
2006	117.74	93.18	83.11	116.80	117.32
2007	115.82	95.75	71.47	118.07	106.18
2008	127.23	105.23	85.25	130.17	124.29

Source: FAO, 2009

Annexure2: Per Capita GDP Growth (%)

Years	Bangladesh	India	Nepal	Pakistan	Sri Lanka
1991	1	-1	4	2	3
1992	3	3	2	5	3
1993	2	3	1	-1	6
1994	2	6	6	1	4
1995	3	7.3	1	2	5.5
1996	2	8.0	3	2	3.8
1997	3	4.3	3	-1	6.4
1998	3	6.7	1	0	4.8
1999	3	6.4	2	1	4.3
2000	4	4.4	4	2	6.0
2001	3	5.8	3	-1	-1.4
2002	2	3.8	-3	1	4.0
2003	3	8.5	1	2	5.9
2004	4	7.5	2	4	5.4
2005	4	9.5	1	5	6.2
2006 ^a	5.2	8.0	1.1	3.9	6.5
2007 ^a	5.0	7.5	1.1	4.9	6.1
2008 ^a	4.9	7.2	3.0	2.3	5.0
Average	3.17	5.88	2.01	1.95	4.69

Source: World Development Indicators 2008

^a ADB 2008

Annexure 3: World Wheat Price Relative to Price of Rice (Index January-2000=100)

Month	Year 2000		Year 2002		Year 2004		Year 2006		Year 2008	
	Price Ratio	Index	Price Ratio	Index	Price Ratio	Index	Price Ratio	Index	Price Ratio	Index
January	0.45	100.00	0.65	143.32	0.77	169.76	0.56	123.20	0.98	215.15
February	0.45	99.36	0.63	138.84	0.74	163.72	0.59	129.16	0.95	208.28
March	0.49	106.80	0.64	141.39	0.67	146.50	0.59	128.98	0.85	186.71
April	0.52	113.87	0.64	141.36	0.70	153.57	0.61	133.27	0.46	100.17
May	0.55	120.66	0.60	132.19	0.70	154.53	0.63	138.63	0.36	79.99
June	0.58	127.73	0.64	139.96	0.68	148.51	0.64	140.91	0.41	90.32
July	0.60	132.83	0.74	162.33	0.65	142.65	0.66	145.29	0.41	90.28
August	0.60	131.28	0.84	184.16	0.60	131.20	0.63	137.87	0.43	95.21
September	0.67	147.54	0.99	218.42	0.64	140.92	0.66	145.11	0.41	89.83
October	0.70	153.47	1.02	223.85	0.62	136.38	0.71	157.07	0.38	83.80
November	0.68	149.67	0.96	211.09	0.61	135.03	0.72	157.41	0.42	91.98
December	0.70	153.95	0.87	190.49	0.57	125.86	0.69	152.64	0.40	88.87
Month	Year 2001		Year 2003		Year 2005		Year 2007		Year 2009	
	Price Ratio	Index	Price Ratio	Index	Price Ratio	Index	Price Ratio	Index	Price Ratio	Index
January	0.73	159.45	0.76	168.14	0.54	117.71	0.66	144.04	0.42	92.87
February	0.69	151.30	0.77	169.06	0.52	113.63	0.64	141.17	0.39	84.79
March	0.74	163.30	0.74	161.64	0.54	117.76	0.64	141.42	0.39	84.74
April	0.77	168.95	0.72	159.07	0.50	108.91	0.64	140.69	0.40	88.69
May	0.80	176.60	0.72	158.97	0.51	111.23	0.63	137.54	0.47	102.65
June	0.75	164.71	0.65	142.02	0.51	112.40	0.68	148.78	0.46	101.99
July	0.73	159.47	0.65	141.96	0.53	115.90	0.73	160.65	0.40	87.47
August	0.72	159.03	0.77	169.01	0.54	119.14	0.81	178.96	0.39	84.74
September	0.72	159.19	0.75	165.31	0.57	126.22	1.03	226.31		
October	0.72	158.86	0.74	162.69	0.60	131.17	1.05	230.29		
November	0.72	158.74	0.84	185.18	0.59	129.94	0.93	205.35		
December	0.68	150.58	0.87	190.28	0.59	128.92	1.01	222.79		

Source: Calculations based on FAO (2009)

Annexure 4: Immunization, DPT (% of children ages 12-23 months)

Years	Bangladesh	Bhutan	India	Maldives	Nepal	Pakistan	Sri Lanka
1991	74	91	57	97	46	50	86
1992	66	86	56	98	49	42	88
1993	74	79	61	90	51	37	90
1994	84	86	67	96	54	39	88
1995	69	87	71	94	54	58	93
1996	77	87	66	96	65	46	92
1997	78	87	62	97	78	52	97
1998	82	86	58	97	76	58	94
1999	81	88	55	97	73	60	99
2000	83	92	57	97	72	61	99
2001	85	88	59	98	72	63	99
2002	83	86	59	98	72	68	98
2003	81	95	59	98	78	67	99
2004	88	89	59	96	80	65	97
2005	88	95	59	98	75	72	99
	88		55		89	83	99

Source: WDI 2008 and other issues

Annexure 5: Immunization, measles (% of children ages 12-23 months) WDI

Years	Sri Lanka	Bangladesh	Pakistan	Nepal	Maldives	India	Bhutan
1991	79	68	51	57	97	43	89
1992	82	69	52	58	98	51	86
1993	86	74	52	58	86	59	84
1994	84	78	53	58	97	67	81
1995	87	79	47	56	96	72	85
1996	89	69	50	65	95	66	85
1997	94	72	52	73	96	55	84
1998	94	72	55	72	98	51	71
1999	95	76	56	72	97	50	76
2000	99	76	56	71	99	52	76
2001	99	77	57	71	99	53	78
2002	99	75	63	71	99	55	78
2003	99	76	61	75	96	56	88
2004	96	81	67	73	97	58	87
2005	99	81	78	74	97	59	93
2006	99	81	80	85	97	59	90

Source: WDI 2008 and other issues

Annexure 6: Food Security Index (1990=100)

Year	Bangladesh	India	Nepal	Pakistan	Sri Lanka	SAARC
1990	100.00	100.00	100.00	100.00	100.00	100.00
1991	100.03	101.33	94.22	99.20	95.35	100.77
1992	99.13	99.05	82.41	101.14	93.31	98.90
1993	97.28	102.26	93.06	103.79	98.70	101.70
1994	91.99	102.73	87.04	97.13	100.75	100.77
1995	93.64	101.96	94.12	102.80	103.57	101.09
1996	96.56	100.97	95.96	101.90	83.79	100.28
1997	95.62	103.84	94.75	99.38	87.84	102.16
1998	98.38	102.40	92.73	105.12	98.18	102.04
1999	106.69	105.58	93.64	102.15	101.96	105.07
2000	110.83	105.04	98.55	109.58	101.67	105.95
2001	106.40	104.46	96.89	100.42	97.19	104.00
2002	107.42	96.33	96.82	98.54	101.17	97.77
2003	107.37	98.93	97.01	101.23	106.13	100.10
2004	101.20	98.74	99.70	100.87	95.56	99.20
2005	105.14	99.74	97.77	106.08	109.52	101.06
2006	109.46	99.20	94.99	104.09	112.07	100.86
2007	108.04	101.71	90.79	108.60	103.61	102.92
2008	115.33	105.92	93.87	102.20	114.64	106.38

Source: calculation based on FAO and WDI data

Annexure 7: Percentage Shares of Intra-Regional Imports in Total Imports (%)

Year	Bangladesh	India	Nepal	Pakistan	Sri Lanka
1985	3.46	0.69	32.43	1.59	6.17
1986	3.57	0.49	32.44	1.75	7.64
1987	4.28	0.5	18.8	1.61	6.49
1988	5.28	0.48	18.09	1.86	7.79
1989	4.48	0.28	12.11	1.75	5.79
1990	6.48	0.41	11.7	1.64	6.74
1991	7.47	0.54	13.76	1.42	6.88
1992	10.13	0.83	17.4	1.48	11.89
1993	11.88	0.45	17.23	1.55	10.11
1994	12.76	0.49	18.37	1.55	10.58
1995	17.66	0.53	17.53	1.46	11.08
1996	16.29	0.5	28.55	2.41	12.59
1997	12.91	0.45	26.76	1.96	10.7
1998	17.26	1.11	31.66	2.42	10.09
1999	13.47	0.80	31.99	1.94	9.78
2000	11.68	0.73	33.15	2.32	10.11
2001	12.40	1.15	NA	3.18	13.20
2002	14.85	0.86	NA	2.32	15.48
2003	15.60	0.91	53.60	2.65	18.05
2004	12.66	0.90	NA	3.33	18.98
2005	NA	0.95	NA	3.05	19.08
2006	NA	0.81	NA	NA	NA

Source: Din and Qadir 2003 and Khan et al 2008.

NA: Figures not available

Annexure 8: Percentage Shares of Intra-Regional Exports in Total Exports (%)

Year	Bangladesh	India	Nepal	Pakistan	Sri Lanka
1985	7.65	3.25	38.32	5.28	3.8
1986	6.06	3.01	38.11	3.20	4.52
1987	4.10	2.82	27.84	3.92	3.58
1988	5.00	2.78	17.63	5.04	5.76
1989	3.90	2.43	2.69	3.51	5.21
1990	3.62	2.71	7.19	3.97	3.3
1991	4.70	1.78	7.86	3.33	2.6
1992	2.21	3.83	13.07	4.93	1.97
1993	2.42	4.00	4.69	3.21	2.17
1994	2.30	4.13	3.87	3.25	2.37
1995	2.65	4.98	8.70	3.13	2.28
1996	1.82	4.92	12.99	2.54	2.27
1997	2.26	4.36	25.44	1.75	2.05
1998	2.69	5.46	36.49	4.08	1.53
1999	1.92	4.82	28.85	3.27	2.03
2000	1.57	4.43	26.95	2.92	1.81
2001	0.91	4.68	45.18	4.53	NA
2002	1.18	5.28	NA	4.27	3.37
2003	3.07	10.83	NA	4.56	5.43
2004	4.76	5.59	53.85	6.28	7.07
2005	NA	5.39	NA	7.18	9.12
2006	NA	5.12	NA	11.19	10.46

Source: Din and Qadir 2003 and Khan et al 2008.

NA: Figures not available